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ORIGINAL ARTICLES

PRESIDENT'S ADDRESS*

BY LELAND E. CARTER, D.D.S., SAN FRANCISCO, CALIF.

IT IS my esteemed privilege to extend a most cordial welcome to our guests and to greet the members of this organization with a sincere expression of my appreciation for having been given the opportunity to serve as president of the Pacific Coast Society of Orthodontists during the past two years. This is an honor, I assure you, upon which I shall look back during the succeeding years with many pleasant memories.

Through the ages it has been the custom of man to gather in groups for protection, for social intercourse, and for education. As time has gone by, evolution has made our instinctive activities more complex and purposeful. Finally, the broadening consciousness of kind and the desire to perfect mental agreement has resulted in the formation of groups for the promotion of special activities. And so we have gathered here, perhaps actuated to some extent by the pleasant anticipation of enjoying the companionship of friends and colleagues, but primarily for educational purposes—to improve our knowledge that we may more efficiently serve humanity.

Past experiences will influence our deliberations now; and by the same token, ideas released at this meeting may guide our efforts in the future. Therefore, I feel it is not amiss to direct your attention for a few moments to the events immediately responsible for the organization and development of the Pacific Coast Society of Orthodontists.

It may well be said that orthodontia was born as a specialty when Dr. Angle organized the Angle School of Orthodontia in 1900, and that it was given the impetus to take its place among the specialties of science by the

*Read before the Pacific Coast Society of Orthodontists, San Francisco, Calif., February 16, 1926.

formation of a society in 1901 which later became the American Society of Orthodontists.

At this time orthodontia as a specialty was unknown on the Pacific Coast. It is true that a few dentists, notably among whom was Dr. Goddard, gave some considerable attention to the regulation of teeth, but their efforts along this line were conducted as a part of their general practice and not as a specialty.

However, this fertile field of orthodontic possibilities was not destined to remain unexplored for any great length of time. In 1902 Dr. Robert Dunn, one of the graduates of Dr. Angle's school, made his way to the Pacific Coast and finally settled in San Francisco. This marked the beginning of orthodontia as a specialty on the Pacific Coast. The example of this intrepid pioneer was immediately followed by other graduates of the Angle School and in a very short space of time Los Angeles, Seattle and Portland were invaded by those who had espoused this new specialty.

Most of these pioneers were members of the American Society of Orthodontists; but as the trip east each year was not only expensive but necessitated a long absence from practice, the idea of forming a society on the Pacific Coast was, in 1913, conceived and put into execution with the formation of the Pacific Coast Society of Orthodontists. The original meeting consisted of nine members, and Dr. Robert Dunn, as the pioneer orthodontist among this little group, was elected the first president. From this very humble beginning, the society has grown until it numbers forty-two active members, eight corresponding members and three honorary members,—truly a remarkable growth, when the qualifications for membership and the size of the territory are taken into consideration.

The distance between the various cities on the Pacific Coast made it impracticable to hold meetings oftener than once a year, but because of the desire of the members to exchange ideas more frequently, the society was divided in 1922 into three sections, namely, the Southern Section, composed of members in Los Angeles and vicinity; the Northern Section, consisting of members in central and northern California; and the Washington-Oregon Section, composed of members practicing in these two states. These sections meet several times a year and their activities are set forth in a bulletin published by the Society under the editorship of Dr. Carl O. Engstrom, of Sacramento.

It is to the lasting credit of its members that this society is singularly free from political influence and internal squabbles. Differences of opinion are bound to arise, but they have always been settled in an amicable manner. When members can realize that the society is bigger than the individual and are able to submerge their personal feelings for the benefit of the body as a whole, it shows a spirit of cooperation that can only result in a strong and efficient organization.

Thus we meet to consider our problems in an open-minded manner, having no thought of allowing prejudice to influence our deliberations.

Of all the various suggestions offered for the improvement of our specialty, I believe we might find it well worth our while to focus our atten-

tion upon one theory that threatens the fundamental principles upon which our science has been built. Permit me, then, to broach this subject by reverting to our past experiences for a moment.

When Dr. Angle brought order out of confusion by the establishment of his school, he laid down certain tenets to be followed by his pupils. He established a system which even to the present day has a potent influence upon the practice of orthodontia.

But as our ranks were augmented by men of initiative and enterprise, who, regardless of personal friendship or reverent memories, insisted upon practicing as their experience dictated, the influence of Dr. Angle began to wane and we have had various systems and theories brought to our attention. Some have stood the test of time, while others have fallen by the wayside—exploded theoretic bubbles. We have lived through an era of mechanical experimentation and theoretic speculation; but from all the chaff much good wheat has been saved to add to our store of knowledge. Therefore, we are justified in claiming that our specialty has made substantial progress.

But today we stand confronted with a theory that pretends to make fiction of Angle's theory of the constancy of the maxillary first molar. With this new doctrine upset the theory that has successfully withstood the onslaught of years of contradiction to the extent that a better theory has never been put into practical use, regardless of the many that have been offered? Of all the various opponents of Angle's classification, with the possible exception of Dr. Case's method of diagnosis, the new theory propounded by Dr. Simon seems to be the most formidable.

It would appear, therefore, that we may be standing upon the threshold of a new era in orthodontic practice. Will Dr. Simon's doctrine revolutionize science, or will it fit in as an adjunct to our present method and make our future problems less puzzling? We must take into consideration that this new theory is not an overnight production, but was evolved after years of patient study and painstaking investigation. It is admitted that this new method of diagnosis is based on fiction,—but it is claimed that it is better and more useful than Angle's fiction of the constancy of the maxillary first molar.

The whole question, then, seems to depend upon which is really the better fiction.

Far be it from me to evidence partisanship in regard to these two theories. Rather do I urge the excluding of prejudice in favor of a cold, careful analysis, with absolute disregard of personal affiliations.

Knowledge is gained through the process of elimination of theories, or their conversion into facts. Experiment is the great aid to scientific inquiry and by this method Simon's theory must be judged.

We are fortunate in having programmed for this meeting a clinic on Dr. Simon's work by Dr. Suggett, who has given this new theory intensive study and a practical investigation. My purpose in focusing your attention upon these two theories is not only because Dr. Simon's work may be a most important contribution to orthodontic knowledge, but also because California is peculiarly situated in that she has Dr. Angle's School in Pasa-

dena, which of course expounds the Angle theory; and a graduate school of orthodontia at the University of California, in San Francisco, directed by Dr. Suggett, who is teaching Simon's theory of diagnosis in conjunction with established methods of practice.

Regardless of what our conclusions may be in respect to Dr. Simon's theory, let us not forget that we owe to Dr. Angle full credit for his wonderful contribution to the science of orthodontia.

It is customary for the retiring presiding officer of some orthodontic societies to report the progress during his incumbency and to offer suggestions for the improvement of the organization. But due to the fact that the Pacific Coast Society is divided into sections, which enables the members to keep in close touch with proceedings, I believe such a report would be unnecessary. Our method of electing directors from the sections in rotation each year keeps two experienced directors in office all the time. This insures competent advisers to the new officers elected at each general meeting.

In conclusion, I wish to express my appreciation of the cooperation of our board of directors, and especially do I wish to commend our secretary, Dr. Carl O. Engstrom, for his persistent, patient and tireless efforts in behalf of this organization.

DISCUSSION

Dr. A. A. Solley, San Francisco.—I feel as if our president has been unfair to me. The paper does not agree with the one he presented to me. He called me up last night by telephone and told me that he would probably change the paper a little bit but I think he has presented a different paper.

One thing that gave me a great deal of pleasure was to hear Dr. Carter mention the name of Dr. Goddard of San Francisco as one of our earlier pioneers in the field of orthodontics.

Dr. Goddard at that time was one of the few men who gave orthodontia any deep thought—he realized it was only in its infancy, but spoke glowingly of its future possibilities as a great specialty. He did much for orthodontia in his time and deserves a name as one of the early pioneers. He stood high enough in his work to receive the recognition of Dr. Angle. Dr. Carter spoke of the fact that most of the early orthodontists on this coast were members of the A. S. of O. He should have gone further and stated that an equal number were members of a society known as the Alumni Society of the Angle School of Orthodontia which was in force for many years as a very strong society.

It is my earnest conviction that the foundation process of this society in its humble beginning was due to the strong bond of friendship that grew up between these pioneers. Always willing to extend a helping hand in their problems—always glad to impart any new knowledge they had; in fact, it seems to me their motto was—"Learn and Give, Give and Learn," and to this day they have continued the same policy. Because of the foundations laid by their leadership, this society has realized that the society as a whole is bigger than the individual.

As to Dr. Simon's doctrine even granting that he may be right, it is not going to revolutionize our science as this idea only fits into one corner of our work, that of diagnosis and case classification and here it ends. It seems to me when ideas as broad as Dr. Simon's are presented to the orthodontic world that we as a society should function in such a manner that within a reasonable length of time we should be able to either accept or discard ideas worthy of consideration. Should twenty of our members be appointed or be allowed to volunteer to carry on in these ideas well worthy of consideration, in a year or two we would be able to consider them on their true merits and be in a position more quickly to profit by them.

Today the dawn of a new day is before us—light is breaking through the clouds and mechanics which have long been to the fore in our work are to be subservient to science.

Mechanics will always play a part but must give way to a deeper insight of a deeper scientific nature.

In proof of this, I offer you the accepted scientific ideas of some of our leading orthodontists:

1. Mershon's idea of a mild stimulating pressure continuous in action over that of force. This idea I consider one of the greatest advancements of recent orthodontics.

2. Hawley's Plate Retention: Natural tooth movement during retention versus fixed retention.

3. Rodger's Muscle Harmony.

4. Dunn's Vertical Development.

5. And Simon's I hope with a real Scientific Plan of Diagnosis.

To Angle, Case, Ottolengui, Jackson, and Goddard we owe a great deal but greater lights are going to shine forth in this our chosen profession, scientific orthodontics.

I may be digressing for the moment but I feel that Dr. Ketcham is to be commented on bringing to the notice of the society as a whole such articles as Dr. Howe's, pertaining to the factor of diet in dental disease. It shows us the great work before us into which we must delve, how wide our sphere is becoming. I believe we are equal to the occasion—let's step forth and let orthodontia be the leading light in dentistry for all time to come.

Dr. McCauley (chairman).—Our time is limited for the discussion of the president's address.

I think I can see symptoms already of the beginning of a very important meeting of orthodontists.

The president's address deals largely with a new theory and I want to ask Dr. Suggett to open this discussion and to state, as briefly and clearly as possible, the meaning of the new theory mentioned by the president—Dr. Simon's theory of diagnosis.

Dr. A. H. Suggett, San Francisco.—To properly present Dr. Simon's research work, extending over ten years, in a short few minutes is almost like trying to explain the nebular hypothesis at an afternoon tea.

Dr. Simon's work is founded on anthropology. Anthropology is nothing new to the scientific world. For years and years scientists, have been measuring the bones of the human being. In measuring the head, in craniometry, they have decided on two planes that were very important as a foundation.

For instance, the raphe medium plane of the head is a plane that has been accepted by anthropologists for a great many years. That is a plane that is extended through the head, bisecting the basion, which is the anterior point of the foramen magnum and the nasion. This plane runs through the middle of the palate and through the head, thus bisecting it and is accepted as the middle plane of the head which they measure for symmetry in the cross section of the head.

There is another plane which has been adopted and is called the horizontal plane. There was a question on about what position the head should take while being measured. They decided on the eye-ear plane, which was called the horizontal plane. That plane passed through a point just above the tragus, which corresponds to the external auditory ear, to the upper edge of the orbital plate, just under the eye, and that plane is called the Franklin horizontal plane.

Dr. Simon held, as a great many of us have held, that there must be some way of expressing the relation of the teeth to the head. We have been talking about teeth being too far forward, too far backward, too narrow, too wide, too long, and too short, but we have never had any particular point or plane from which to measure. It was indefinite. I have heard men say that we could not measure the head and get this correct relationship. If we believe that we certainly would throw away all the work that has been done by

anthropologists. The measurements of the head are as accurate as any measurements made of any other parts of the body. There is no question about being able to measure the head.

Dr. Simon wanted to find the relation of the teeth to the head. He wanted this relationship to show on the model. In this he succeeded. The proper relation of the two jaws did not tell the whole story. While the two jaws may be in occlusion there was still that proposition of being too far forward, too far backward, or too narrow, or too far down, and so on, so he devised a scheme by which he could locate the teeth in relation to the head. It was necessary to locate a place from which to measure. He had the raphe medium plane by which he could measure in or out; he had the eye-ear plane by which he could measure up or down; he then had to devise another plane by which he could measure forward or backward. So, he first laid down the principle that we must have these planes outside of the influence of malocclusion. He accepted the eye-ear plane and the raphe medium plane as they fulfilled this requirement, and then he brought down another plane, an orbital plane, at right angle to the others. All three planes bisect the arches, and from them he could measure forward and backward, in or out, up or down. After many years of research along that line he found that this orbital plane dropping down at right angles to the eye-ear plane, and to the raphe medium plane, in normal occlusion bisected the maxillary canine. He found out by measuring many cases that the law of the canine was constant, and passed through the points of the canine, whether the child was ten years old, fifteen years old or twenty years old. He found that that rule seemed to hold good in 85 per cent of the cases he examined. Then he had to devise a scheme to take this impression, with an appliance on the head pointing to these different points on the orbits and the tragus. He then took the impression out but kept the relationship so when he made the model, the top of it would represent the eye-ear plane, and show the relation of those teeth to the head. The top of the model represents the eye-ear plane, as accurately as we can expect to come on a living human being, and is as near as we want it for calculation.

That gives us a model in which the top represents the eye-ear plane. The orbital plane is marked and we can now get all of our measurements on our charts and make our regular curves and diagrams, just as engineers make curves in their work.

A photostat is used in this work. We have had pictures for many years of our cases and those pictures meant nothing because we had no standardized position in which models were placed. For instance, there is quite a joke in one of the texts of a case taken with the head down, showing an undeveloped chin. Another picture was taken, after five years, showing a good looking chin. The position of the head was different. With the photostat, all pictures are taken so many centimeters from the camera, always the same distance. There is a marker that indicates the patient is at right angles to the photostat, and in such a position that the eye-ear plane is on the horizontal so that the picture records a certain position and is one-fourth life size. If the second picture is taken five or ten years later the difference in the pictures will represent the difference or growth in the face. You can take a picture today and take the same picture four or five years later and the difference recorded will show the growth. The difference between these two pictures will represent growth because they will both be taken at the same distance and in the same position. The pictures mean something else. They show where the orbital plane bisects the arches and we record that on our chart. This plane when marked on the photo should pass down from the orbital plane to the corner of the mouth and through the gnathion, and the forward and lower part of the jaw. That is the normal position. In some cases, however, it drops in front of it, and in others, it will drop distally. I have some cases where the orbital plane drops almost as far back as the molars, which shows the inconstancy of the molars. We find a variation of an inch in some cases and we find many that show as much as half an inch. However, the maxillary molars are just about as constant as the canines.

Our measurements are as accurate as the measures made by the anthropologists. We are using two of the planes that they have accepted for half a century. Our measurements are as scientific as anthropology itself.

These planes are the basis of our diagnosis. They show whether these teeth are inclined toward the plane or parallel to the plane, and practically everything that is in the mouth can be diagnosed on these curves and on these plates, so when that is finished you have a diagnosis as complete as we know how to make today.

NOTE: Read Dr. B. E. Lischer's excellent article on Photography for Orthodontists in March number of THE INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY.

Dr. James D. McCoy, Los Angeles.—I was very much pleased with the president's address and shall endeavor to discuss one or two of the many interesting points he brought out.

His reference to the rise and fall of the systems was interesting from an historical standpoint. At the present time I feel that, every orthodontist should endeavor to get away from the question of systems for in this present day their influence is anything but a wholesome thing in our specialty. I believe that the orthodontist who talks appliances or systems to his patients does a questionable thing, when considered either from the standpoint of ethics or good taste. If there is one thing that we should strive to do it is to practice non-sectarian orthodontia. Why should we not get in the habit of using that term. When we have contact with patients who have been subjected to propaganda from appliance manufacturers or their "henchmen," who inquire, "Doctor, what system do you practice?" We should simply tell them that we practice nonsectarian orthodontia and are not bound by the confines of anybody's patented appliances.

Our president has emphasized an important point when he referred to Dr. Simon's work. Certainly, diagnosis is one of the very foundation stones upon which our specialty must stand, and if Dr. Simon has contributed even in a small way we will benefit, and if he has contributed in a large way as some very able orthodontists seem to think, our field will be greatly enriched.

Dr. McCauley.—I am going to ask that this discussion of the president's address be continued by Dr. W. R. Dinham, of the Washington-Oregon Section.

Dr. W. R. Dinham, Washington-Oregon Section.—I did not make any notes and I did not know that I was going to be called upon to discuss this address. I will say, however, that it was a splendid address.

I have had several months' experience with Simon's method of diagnosis and I am hoping Dr. Suggett can clear up some points in my mind which will not make this method so exacting as when I first heard it explained. There is no question but what this method has a very important place in orthodontia today.

The question of extracting premolars, advocated by Dr. Case in certain cases, has met with some disagreement by many men. In my own particular case I have found that extractions are sometimes necessary and I have found by Dr. Simon's method that I can at least find a scientific reason for extractions and that alone has been worth a great deal to me.

I cannot add anything to Dr. Carter's address. His address was most interesting and it covered the ground nicely.

Dr. McCauley.—Dr. B. Frank Gray will you kindly continue the discussion?

Dr. B. Frank Gray, San Francisco.—I will have only a word of appreciation. Dr. Carter has certainly favored us with an interesting address. I think it was rather timely for him to bring out the points he has as to the relative merits of diagnostic systems, particularly mentioning the Simon method, which is claiming considerable attention, and the one we know so much about, the Angle classification of malocclusion.

While I am disposed to be conservative in such matters I feel I know too little of the Simon method either to decry it or applaud it. I think we are very fortunate to have Dr. Suggett so interested in it as to go ahead and make his deductions and experiment with it, and it would be splendid to have others join in that investigation, out of it all will come some basis for acceptance or for rejection, as the case may be thus, placing it where

it belongs in the work of orthodontia. Personally, I know very little about it. I think it is one of those rather technical things that one only gets by actually doing the work with the instruments. We get some ideas from an explanation and description such as Dr. Suggett gave us, but we need to get down and actually use the equipment and do the work and then we will commence to really appreciate whatever value it may have. It is really like going back to dental school days. I could sit in a class and listen to the professor tell how to make a piece of bridge work and it all sounded like Greek until I got into the laboratory and actually did the work.

Dr. Carter is to be congratulated on his very splendid address.

Dr. McCauley.—Dr. W. W. Leslie, of Fresno, is requested to continue the discussion.

Dr. W. W. Leslie, Fresno.—I want to commend Dr. Carter very highly upon his address. I think it is a wonderful paper.

I am very much interested in Dr. Simon's theory. I was here when Dr. Lischer gave the course, but I must confess I haven't followed it like some of the men and I would be glad to go further with it at this time.

Other than that, I wish to congratulate the Doctor on his paper.

Dr. Allen E. Scott, San Francisco.—Dr. Simon's method of diagnosis is a diagnosis and not a treatment. A great many people seem to confuse the treatment with the diagnosis. Simon has a set of models that show a certain number of things. That is purely diagnosis; it is 100 per cent diagnosis. Now, after you have the diagnosis you can treat the case in any way you want to. You can use a ribbon arch, an inside wire, or absent treatment, or any plan you wish.

The Simon method of diagnosis confirms in my mind, at least to a considerable extent, that Dr. Case was about right when he extracted maxillary first premolars in the treatment of malocclusion. But, as I said before, we must not confuse Simon's work with that of treatment. In all Simon's work that I have read I have seen nothing in there that tells how we should or should not treat a certain given case. It is purely a matter of diagnosis to find out what the trouble is.

The same thing is true of medicine. A patient may have a disease of the kidneys, or tuberculosis, or any other disease, the thing to do is to find out what the trouble is and then treat that according to your own wishes.

Dr. H. L. Morehouse, Spokane, Washington.—I am very much interested to find that the trend of the president's address and the trend of the discussion has focussed on diagnosis because I have felt for many years that from a mechanical standpoint orthodontia had reached its zenith. I think, though, that we want to be very cautious in our method of diagnosis. While diagnosis is the primary and chief point in the treatment of orthodontic cases I think we do not want to be in the position that the general profession has been in the past few years in regard to focal infection and be carried away by a great wave of ideas along certain lines and then have to fall back, possibly, to thirty or forty years ago in the treatment of orthodontic cases. I do not want to be misconstrued in my statement as being opposed, in all cases, to judicious extractions, but the question of extractions has been brought up and you will probably notice, in my paper this afternoon, a little hint along the same line, but I am attacking it from a different angle.

I just wanted to add a word of caution that we may not be carried away by a wave of theories as the dental profession was in focal infection, and have to have the experience of going back to a normal basis, or a happy medium, before we reach a solution.

I appreciate Dr. Carter's address and I know it is going to be of benefit to the profession.

Dr. Carter (closing).—I wish to beg Dr. Solley's pardon, and also Dr. Leslie's for not having given them my paper. However, the paper that was given Dr. Solley was practically the same one read to you today except that I changed one paragraph.

Dr. Solley's mention of Dr. Mershon was timely. I think he is a shining example of what persistent effort and painstaking study will do and that he has really contributed some of the grains of wheat to our knowledge that I mentioned.

In mentioning Dr. Angle's School, in Pasadena, I did not wish to precipitate any trouble or rub any sores. I did so with the idea of calling to your attention the fact that we were advantageously located to study these two particular methods of diagnosis. I mentioned that Dr. Angle has ceased to dominate orthodontia for a great many years and regardless of what his ideas are, or his attitude today, I think that we must, in all fair-mindedness, give him credit for what he did for orthodontia in its very beginning.

I did not wish to suggest that we advocate any particular system. I think it is very very bad practice for any orthodontist to claim that he has an advantage over his fellow-practitioners because he follows any particular system or uses any special appliances.

I was pleased that Dr. Scott mentioned Dr. Case's name because I have respected Dr. Case as one of our foremost minds in orthodontia for a great many years and I feel that if Dr. Simon's theory proves practical and useful it will prove that Dr. Case was probably twenty-five or thirty years ahead of his time. I believe that we should also think of his name with considerable reverence.

I wish to thank those who have discussed my paper. I want to emphasize the fact that it was my desire to focus your attention on this particular new theory of diagnosis because it is something that is so important for us that we should bend our every effort in trying to determine just what influence it is going to have upon orthodontic practice in the years to come.

Testimonial Dinner to Dr. George B. Winter

A testimonial dinner was given to Dr. Geo. B. Winter, of St. Louis, Missouri, by the St. Louis Dental Society, one of the oldest dental societies in America, on December 6, 1926.

The dinner was given as an appreciation of the scientific work completed by Dr. Winter during a period of the last twenty-six years, pertaining to the Operative Technic for the removal of the various types of Impacted Mandibular Third Molars.

The various speakers of the evening who paid tribute to the wonderful work accomplished by Dr. Winter were:

Dr. Henry L. Banzhaf, President, American Dental Association, Milwaukee, Wis.

Dr. M. C. Marshall, St. Louis, Mo.

Dr. Otto U. King, Secretary, American Dental Association, Chicago, Ill.

Dr. C. R. Grissinger, Pittsburgh, Pa.

Dr. W. F. Whalen, President, Illinois State Society, Peoria, Ill.

Dr. R. Boyd Bogle, Nashville, Tenn.

Dr. Donald M. Gallie, Chicago, Ill.

Dr. J. P. Marshall, Toastmaster.

CEPHALOMETRIC METHODS AND ORTHODONTIA*

BY RUDOLPH SCHWARZ, BASEL, SWITZERLAND

IT WAS van Loon who introduced anthropologic methods into orthodontia; Simon was the first to propose an apparatus for measuring the jaws (a gnathostat, he called it). The purpose of Simon's investigations was to prove the inadequacy of Angle's classification of malocclusion and to replace it by a better one. My aim, from the very outset, has been different; namely, to obtain accurate data on the growth of the jaws, because both from the morphologic and from the etiologic point of view of diagnosis, well established data on the growth of the jaws are indispensable. In order to attain my aim I was forced to construct a special facebow. For I am not satisfied to study the relation of the jaws to the ear-eye plane and the orbital plane, but consider it necessary to include in my measurements the width of the head, the length of the head, and above all, the points of the profile: nasion, subnasal point, gnathion. In this way the chief head points are established in their exact position and relation to the jaw. This constitutes a valuable addition to the possibilities of the representation by diagram; for now it is possible to calculate the correlation between the jaw and the head on the living subject.

My apparatuses and their application were first described in the *Schweizerische Monatsschrift für Zahnheilkunde*, 1923, Nos. 9 and 12; a translation of this article appeared in the *INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY*, 1925, Nos. 10 and 11. I have simplified my procedure since 1923.

I. THE UPPER MODEL

1. *Appliances*.—The facebow consists of a firm metal rod, shaped as shown in Fig. 1. The projecting square in front is intended for fitting the bow on to the upper impression tray; its sides are tubular sockets which, in their length and distance from each other, coincide with two strong parallel pegs, called the guiding pins, which are soldered to the lower side of the upper impression tray, and over which the sockets of the bow are inserted in the course of the procedure. To the bow are fastened four strong vertical rods each with a long and finely pointed screw, which can be moved up and down and also turned sideways, so as to be made to reach the particular facial point which each screw is intended to locate. When a point has been located the screw is firmly secured by means of a counter-nut. A fifth vertical rod with two, or more, screws, is fastened to the projecting square in front of the bow.

2. *Procedure*.—An impression of the maxilla is taken with plaster, which makes the tray rest in the mouth with perfect stability. On to the guiding

*Read before the First International Orthodontic Congress, New York City, August 16-20, 1926.

pins of the tray the facebow is adjusted and then fastened with a screw. It lies approximately on the level of the chewing plane. With the screws on the four vertical rods right and left, we locate the orbital points and the tracion points (Fig. 2), and with the screws on the central rod we determine the nasion (*n*) and the subnasal point (*sn*). If it is desired, further screws may be added, for instance for the nostril points, which Körbitz considers important. The individual location of every particular point greatly facilitates measurements on the patient. Fig. 3 shows that the bow is constructed anatomically correct, so that the desired points can be really reached and

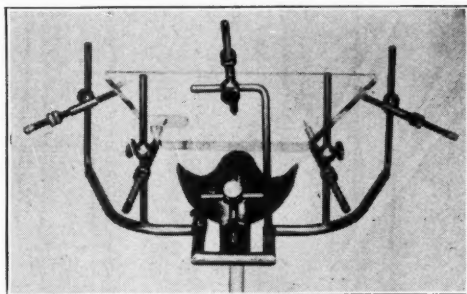


Fig. 1.

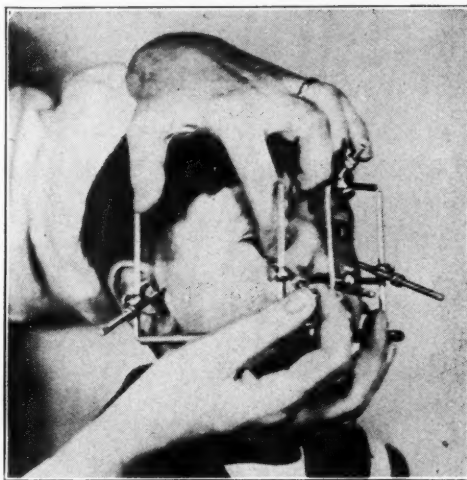


Fig. 2.

fixed with the fine points of the screws. I measure the length of the head (nasion-opisthocranium) independently of the facebow, with the calipers, and the auriculobregmatic height with a special bow. These two measurements have chiefly anthropologic value and may be dispensed with.

The impression is poured, though not too high, on a broad base which ought to extend as far as the tracion points (Fig. 4). The screws which indicate the ear-eye plane being slightly tipped upward (according to a suggestion of S. Dreyfus, Lausanne), a trapezoid-shaped slab of cut glass can be placed right on the screw points (Fig. 1). The tray with the impression poured on a broad base, before the plaster has completely hardened,

is inserted into the facebow. It can now be verified whether or not the cast reaches the points tragion, orbital, and nasion. Then it is trimmed along these points in a trapezoid shape, and a trough is hollowed out for the subnasal point (Fig. 5). On to the roughened surface of the model some soft plaster is laid and the smooth cut-glass slab is gently pressed down onto the screws representing the ear-eye plane, until the points of the screws become visible underneath the glass (Fig. 6). (The screws have to be oiled each time before use to prevent the plaster from clogging the threads.) The glass slab is maintained in this position until the plaster has hardened, then it is removed.

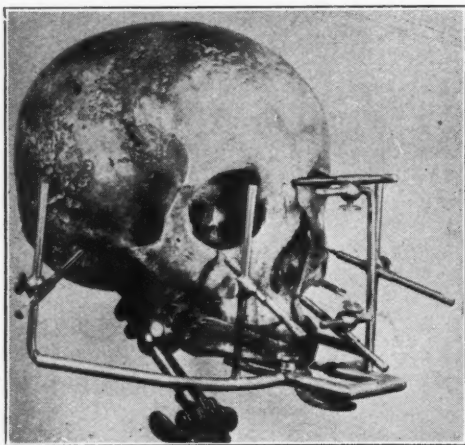


Fig. 3.



Fig. 4.

The results of this more accurate procedure have proved that the four screw points in the majority of cases are situated in one plane. In the case of an asymmetrical position of one of the orbital points only the left orbital point is used in the adjustment, as is the practice in the anthropologic proceeding. In the cases with the right orbital point lying higher, I make use of a glass slab with an opening for the right-hand orbital screw, so that the slab rests only on the three points determining the ear-eye plane (Figs. 1 and 6).

When the surface of the model so obtained is studied, the advantage of this method of measuring appears in strong relief. With the exception of the nasion screw all the screw points are retained in the plaster, so that the measurements can be taken with maximum security either with a rule or

with the sliding calipers. I connect the two orbital points by a line which is scratched into the plaster; likewise the two tracion points, which are previously distinguished by a pencil mark. In this way I obtain the bitragial (or biporial, or biauricular) distance (Fig. 7). Moreover, with the aid of a graduated and broad-based square which I lean against the nasion screw I project the nasion point on the surface of the model, marking it by a scratched cross. At the same time I register the vertical distance from the ear-eye plane, which coincides exactly with the upper side of my model (Fig. 8). Starting from this projected nasion point I scratch a line down to the bitragial center point; this provides a median plane of the head, which is important for the proper adjustment of the model (Fig. 7).

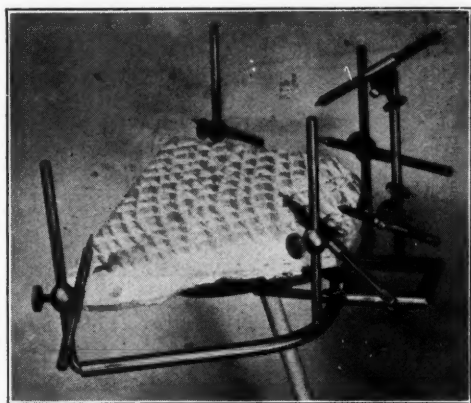


Fig. 5.

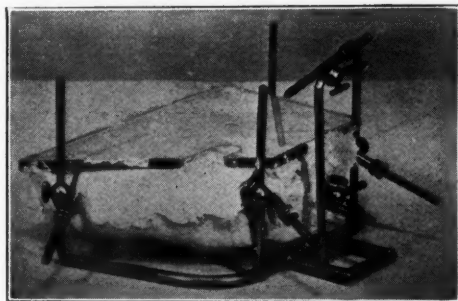


Fig. 6.

If we left the model in this size it would be circumscribed exactly by the nasion point, the subnasal point, the orbital points, and the tracion points. As such large models are neither practical nor handsome, we shall trim the model down to the usual size. This need not deprive us of the measurements taken, seeing that we are in a position to restore them, whenever wanted, with the aid of a record sheet made in the following manner:

3. *The Record Sheet.*—A sheet of tracing paper is placed on the surface of the upper model before the model is trimmed. The nasion point, the orbital points, and the tracion points are marked on it by punctures. The orbital line, the bitragial line, and the line from the nasion to the bitragial

point are traced, and the distances are indicated in figures. All this can be easily done and without the aid of compasses or expert mathematical knowledge. The right and left side should be marked (Fig. 9). In this way we obtain a record sheet, which is entered in a book.

II. THE LOWER MODEL

Along with the impression a model is made of the chin. For this purpose the impression tray has two small tubular sockets soldered onto its lower side in much the same way as the guide pins are soldered to the upper

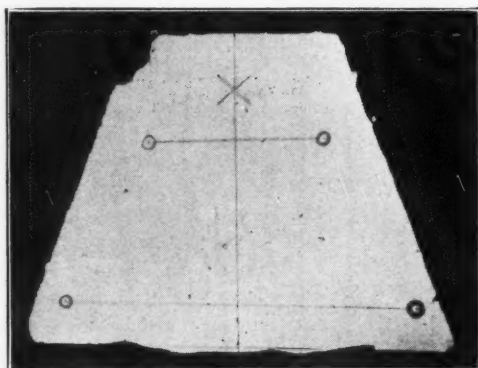


Fig. 7.

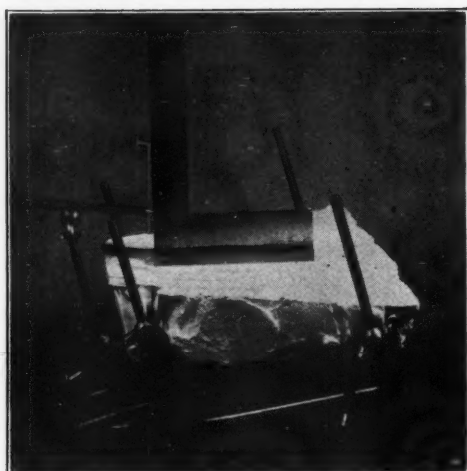


Fig. 8.

tray. They are intended to have the guide pins of a chincap inserted into them when the impression is taken. The chincap can be used with or without a gonion screw (Fig. 10).

(a) *The Chincap Used Without Gonion Screw.*—Take the impression of the mandible. Before it begins to harden, and after the chin has been smeared with vaseline, insert into the sockets of the tray the guide pins of the chincap which is filled with plaster. In this way an impression of the chin is obtained along with the mandible impression. The chin cap is maintained in its position by means of two guide screws, so that its proper relation to

the mandible can be restored after the impressions have been removed. In the laboratory the two impressions (mandible and chin) are joined together and poured, with the chincap on top to facilitate the trimming (Fig. 11).

(b) *The Chincap Used With the Gonion Screw.*—When the chincap is used in conjunction with the gonion screws, it is fitted on either side with a rod on which the screw can be moved into place. In this case the plaster with which the impression and the chincap are poured must be made to extend far enough to embed the points of the gonion screws. The impression tray is placed on top as illustrated by Fig. 12. The upper model with its surface turned downward is laid on a sheet of paper spread on a smooth slab of marble or cut glass. The end points of the orbital line and the raphe scratched on the model are visible on its edge and can be projected on the

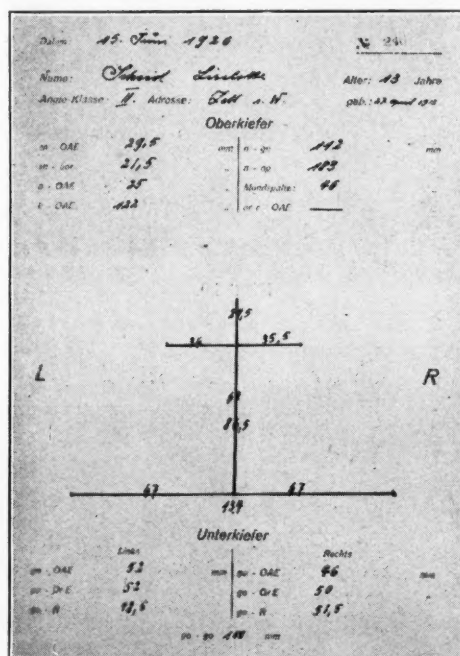


Fig. 9.

paper. Hereupon the lower model, which is separated but not yet trimmed, is set on the upper in the right occlusion. A parallel scriber is now pointed into one gonion point, which has been engraved on the lower model by the sharp end of the gonion screw (Fig. 13). Both models are then removed and the graduated square is set against the needle point of the parallel scriber. In this way the perpendicular distance of the gonion point from the ear-eye plane can be ascertained (vertical dimension) (Fig. 14). The point is projected on the paper and marked with two intersecting lines. The graduated square is then turned over to measure the distance of the gonion point, as projected on the ear-eye plane, from the raphe (latitudinal dimension). In the same way we measure the distance of the gonion point, as projected on the ear-eye plane, from a straight line drawn through the biorbital point at a right angle with the raphe (longitudinal dimension) (Fig. 15).

The other gonion point is dealt with in the same manner.

This projected drawing makes another record sheet; on it we register the figures; and it is entered in the book (Fig. 16).

(c) *Making the Base of the Lower Model Parallel With the Upper.*—The lower model is adjusted into the proper occlusion with the upper. The two together are then placed between two parallel plates connected on one edge by a strong vertical bar. The lower model is uppermost. Some plaster is laid on its base and the upper metal plate is pressed down to the edge of the chin. In



Fig. 10.

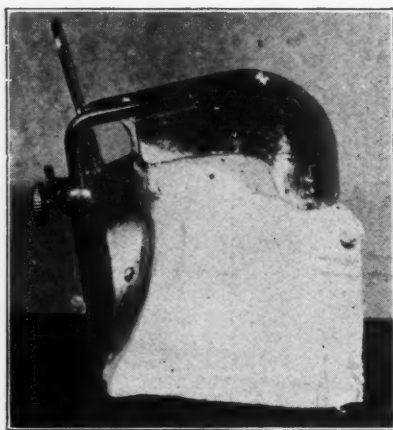


Fig. 11.

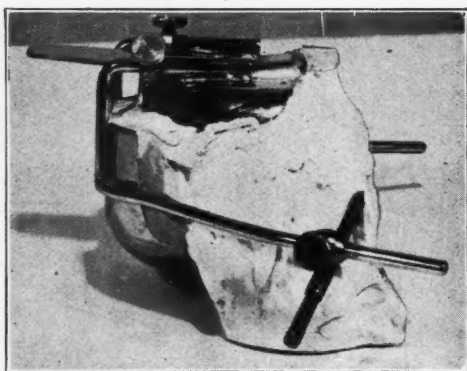


Fig. 12.

this way the base of the lower model is made exactly parallel with the ear-eye plane (Fig. 17). The back and the sides are trimmed with the help of a square so that they coincide with the planes of the upper model.

The models obtained in this way represent the section of the face beginning at the ear-eye plane and reaching down to the gnathion. They provide an accurate representation of every case and are of extraordinary service for giving the diagnosis. The plastic representation of the chin in its exact relation to the lower set of teeth provides valuable information on all the questions concerning the chin problem (Figs. 18, 19 and 20). These models are obtained by means of the facebow, the chincap, and a small apparatus with two parallel

plates. They not only allow us to study the relation in which the orbital plane stands to the two sets of teeth, as by Simon's procedure, but also the relation in which the tracion plane and the profile points stand to the sets of teeth. With the help of the parallel scriber and the broad-based graduated square the essential measurements can be immediately obtained and registered. The models are placed on a sheet of paper in the manner described above for the establishment of the gonion points.

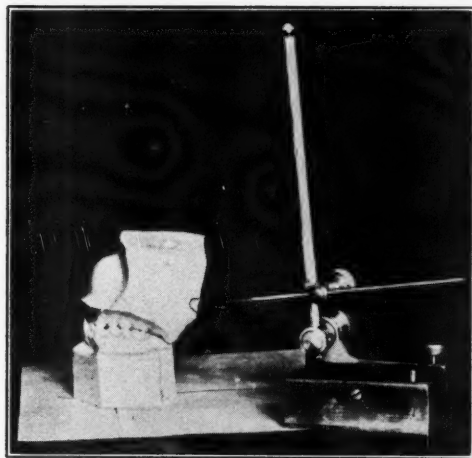


Fig. 13.

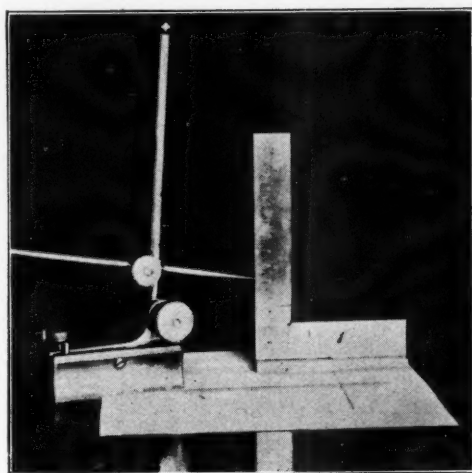


Fig. 14.

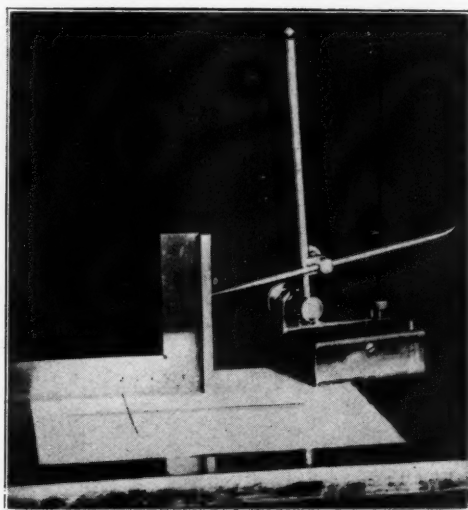


Fig. 15.

The measurements which I register are tabulated. For purpose of statistical comparison the cases are arranged in groups comprising one year of age each, each group being collected in a special book (Fig. 21).

These models are a desirable possession even for practitioners who do not carry out any measurements, and they make an ornament in any collection.

III. THE GEOMETRICAL DRAWING

In order to render the measurements and their correlation to the jaws and teeth of further use to the orthodontist I have elaborated a procedure for making diagrams. I make use of the geometrical drawing, which permits an accurate measuring of the absolute and true dimensions.

(a) *The Stereograph.*—I have constructed an apparatus for the drawing of models on the same principle as my large stereograph for the drawing of skulls. It is based on Broca's idea of a "drawing arm." The main requirement of such an apparatus is that it shall enable us to project on paper the lines of the model in its exact dimensions and proportions. To attain this end it is necessary to place the model in such a way as to render it accessible on all sides. The outstanding feature of my stereograph is a cubical frame of 18 cm., con-

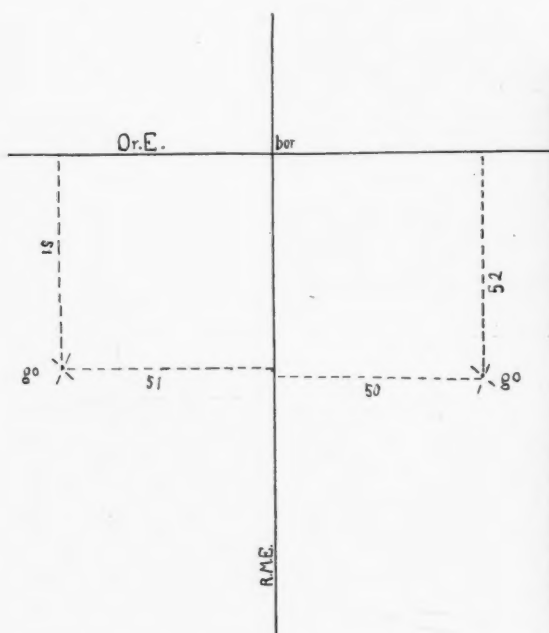


Fig. 16.

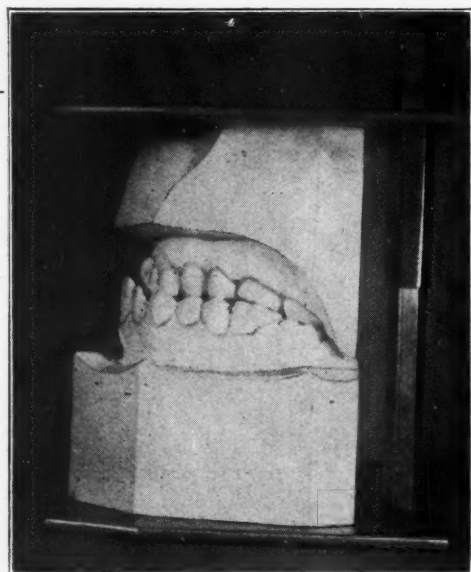


Fig. 17.

structed of firm square metal rods. At the back of the frame a strong and broad steel bar is retained with guide screws, so as to make it possible to move the bar up and down into the desired position (Fig. 22). In the middle of the bar is a flange into which the model-holder is inserted. The model-holder consists of two metal plates joined at a right angle and with slits along their centers (Fig. 23). The model is fixed to the holder by means of a screw. When the apparatus is mounted, the model appears poised on its support in the middle of the frame, and as the support can be made to revolve in the flange, the model is practically accessible from all sides. At the same time it can be retained in any position by means of a screw.

To this frame is attached a "drawing arm." A triangular projection, joined to the two horizontal rods of one side of the frame, constitutes its support. The arm has two joints and is articulated so that it can describe any movement on the horizontal plane with extraordinary ease and precision. The

arm is divided into two parallel members, one at the top and one at the base. At the end of the latter is inserted a lead-pencil which reproduces automatically on the drawing paper the lines traced on the model by the point of the

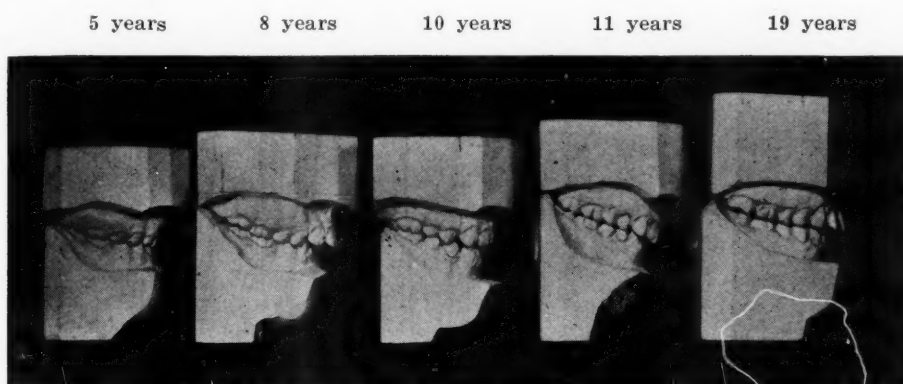


Fig. 18. Angle, Class I.

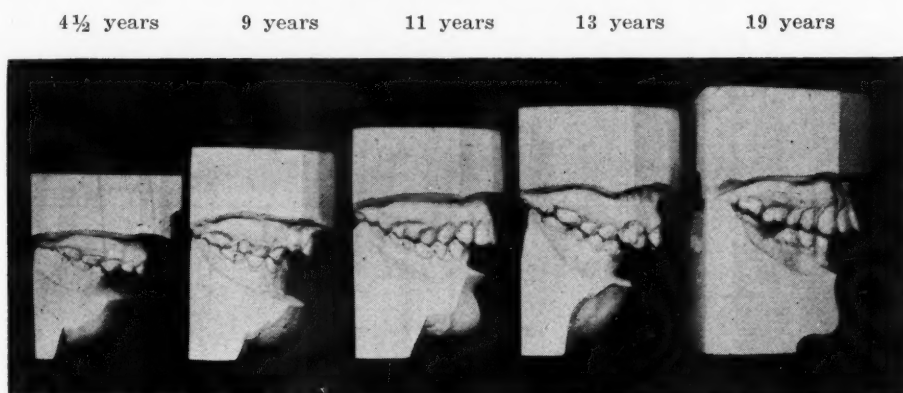


Fig. 19. Angle, Class II.

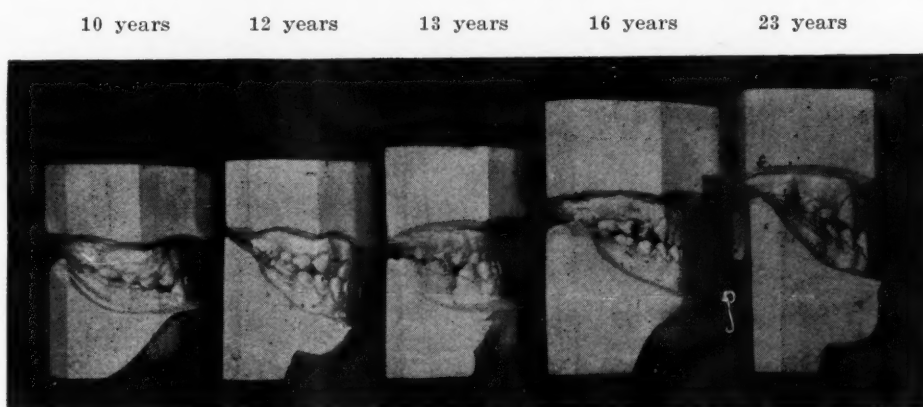


Fig. 20. Angle, Class III.

steel pencil reaching down from the upper member of the arm. The two pencils are so adjusted in their respective holders as to form one perfectly straight line at a right angle with the base of the apparatus. The steel pencil

of the upper member is vertically movable so that its point can freely follow lines up and down. I use two metal pencils which can be equally inserted in the holder, one straight, the other bent in the shape of a hook (either round or square) with its point exactly in a line with its straight shaft. By means

Name		Alter	Angle-Klasse	Höhenmaße										0	
				n OAE	n pr	n gn	an OAE	an pr	pr OAE	id gn	id pr				
Höhenmaße				Längenmaße											
gn OAE	M 1 OAE	h OAE	Summe Ma	or. r OAE	n bor	n bl	n op	an bor	an. bl	pr bl	id bl	M 1 bl	bor bl		
Längenmaße				Breitenmaße				Transversale Verschiebung der Tragia in Bezug auf die							
								Raphenmedianebene			Kiefer-Äquival-Mediane				
id bor	pg bor	pg bl	t - t	go - go	Mund- spalte	Molaren- breite	Zwischen- stube	Lr weiter vorn	Ll weiter vorn	t.r Ll gleich	Lr weiter vorn	t.l weiter vorn	Lr Ll gleich		
Sagittale-Verschiebung in Bezug auf die Raphenmediane Ebene				Verlauf der Orbitallinie		Intermaxillär- Index	Flügel- Kieferindex	Profilwinkel	Kinnwinkel	Unter- kiefer- Index					
Lr weiter vorn	Ll weiter vorn	t.r Ll gleich	t.	r.											

Fig. 21.

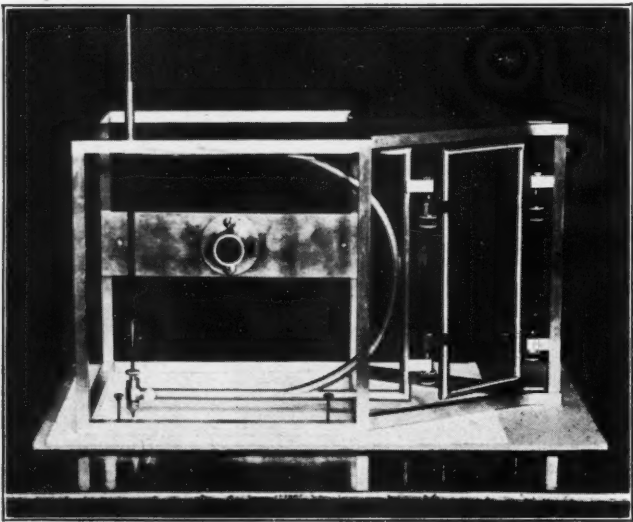


Fig. 22.

of this hooked pencil I can trace and project on the paper those lines and points which are not accessible with the straight pencil.

The stereograph is placed on the drawing sheet, which is laid on a piece of cardboard, and firmly secured by means of strong pins. The base of the

model-holder is adjusted in a position parallel with the sheet. This can be done with the help of the steel pencil, which for this purpose is retained by a screw (Fig. 23). The drawings to be made are as follows:

1. *Projecting the Upper and Lower Model Onto the Horizontal Plane.*—The upper model, the base of which corresponds to the ear-eye plane, is

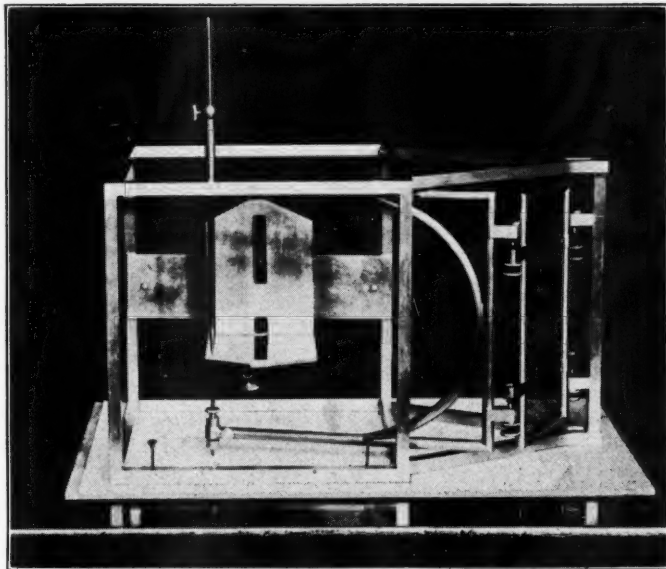


Fig. 23.

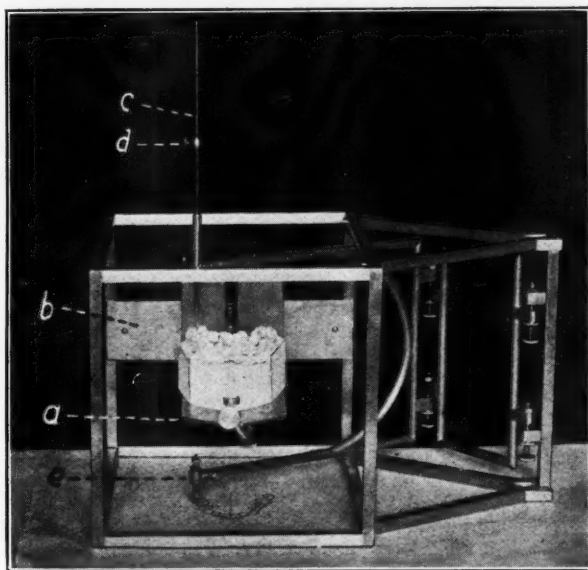


Fig. 24.

screwed to the plate of the holder. With the straight pencil the outlines of the dental arch, the teeth, and their details can be most accurately traced; the raphe-median line is also traced. The orbital line and the nasion bi-tragial line, which are both engraved on the model, are located on the edge of the model with the bent pencil, and projected onto the drawing sheet.

The two lines are afterwards drawn by connecting the points. The subnasal point, too, is projected (Fig. 24). On this drawing, with the aid of the record sheet obtained as a result of our measurements, we can now enter all the other measuring points, such as the orbital points (*or*) and the tragon

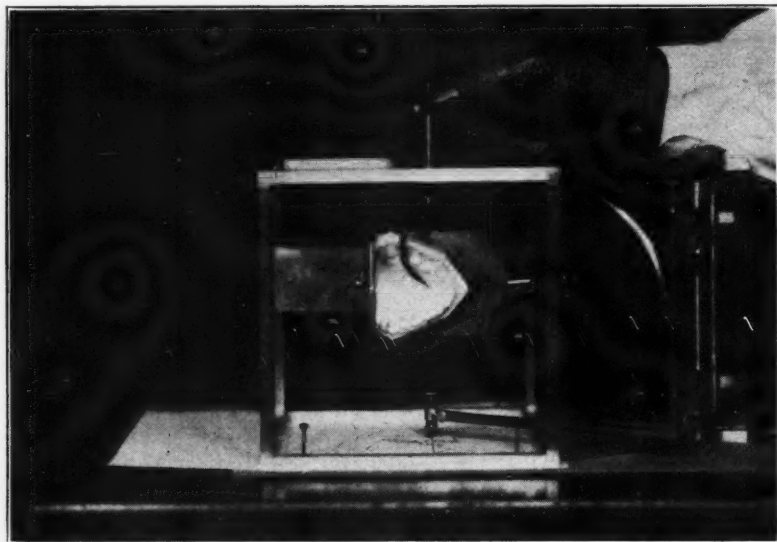


Fig. 25.

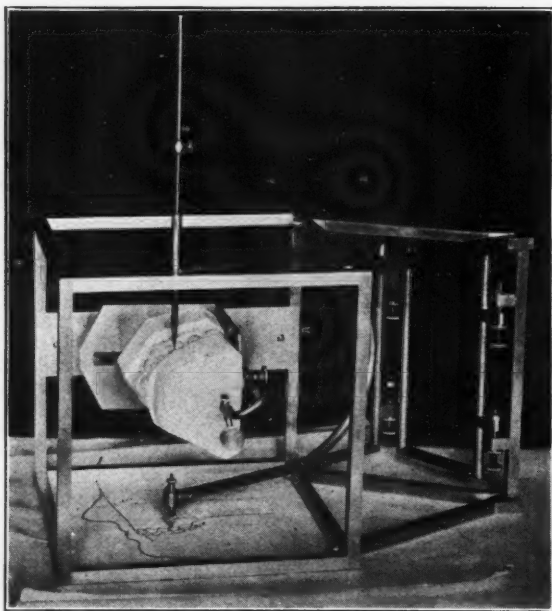


Fig. 26.

points (*t*). All we have to do is to lay the record sheet on the drawing so as to make the orbital line and the nasion line coincide. The connection of the tragon points corresponds to the bitragial (or biporial or biauricular) distance (*t-t*), which corresponds to the width of the head (Martin 5). The length of the head (from nasion to opisthocranium), which I have measured

with the calipers, I also project on the prolongation of the raphe-median line. This completes diagram No. 1. In the same way the lower model is reproduced.

2. *Projecting the Upper and Lower Model Onto the Sagittal Plane.*—The upper model is screwed to the back of the model-holder. With the hooked pencil the raphe is adjusted parallel with the drawing paper, which is easily done, since the model-holder can be turned about. Draw the raphe and prolong it across the model; this operation does not require a symmetroscope (Fig. 25). Screw on the lower model in its proper occlusion with the upper, and then project one side of the model on the paper (Fig. 26). The ear-eye plane and the intersection of the orbital line with the raphe-median line (bi-orbital point) are taken up with the bent pencil exactly in the slit of the back plate of the holder, and marked (Fig. 27); also the subnasal point and the projected nasion point, the vertical distance of which from the ear-eye plane is registered. In this manner we establish the relation to the ear-eye plane not only of the nasion point but also of the vertical plane (Tryfus-Dreyfus)

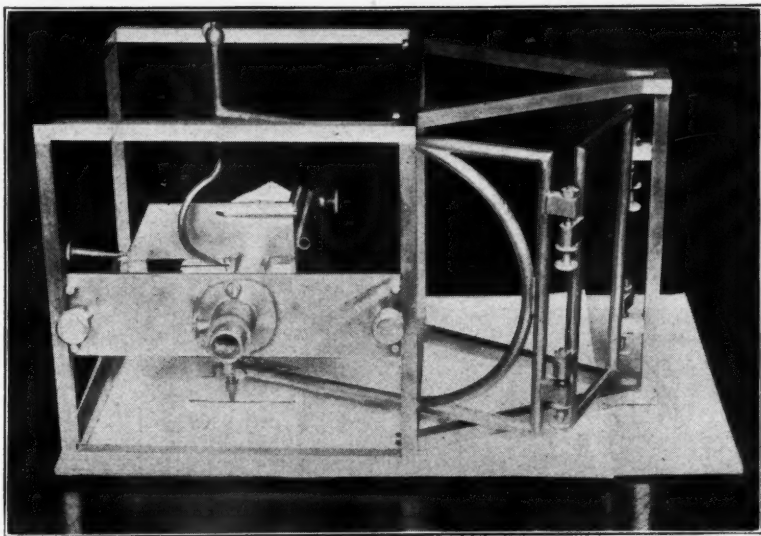


Fig. 27.

and of the horizontal plane (van Loon). The latter (horizontal) section, which extends from the nasion to the edge of the infraorbital, in anthropology is called the eye zone (F. Sarasin). The section from the orbital edge to the subnasal point is the nose zone, the one from the subnasal point to the prosthion is the alveolar zone; the section from the infradental to the gnathion I designate as the chin zone. By means of this division into horizontal zones it is possible to locate accurately the hyperplasias and the hypoplasias of the deformed jaw (Fig. 28).

We further include and register on the sagittal diagram the measurements of the height and the length of the face. The line prosthion-nasion (*pr-n*) is equal to the morphologic height of the upper face (Martin 20); the rectilinear distance of the nasion (*n*) from the gnathion (*gn*) is equal to the morphologic face height (Martin 18). The angle formed by the ear-eye horizontal and a straight line connecting the nasion with the prosthion corres-

ponds to the profile angle (Martin 42), which is measured and entered on the diagram. Further height measurements to be obtained are: the perpendicular distance of the gnathion from the ear-eye plane, which is equal to the height of

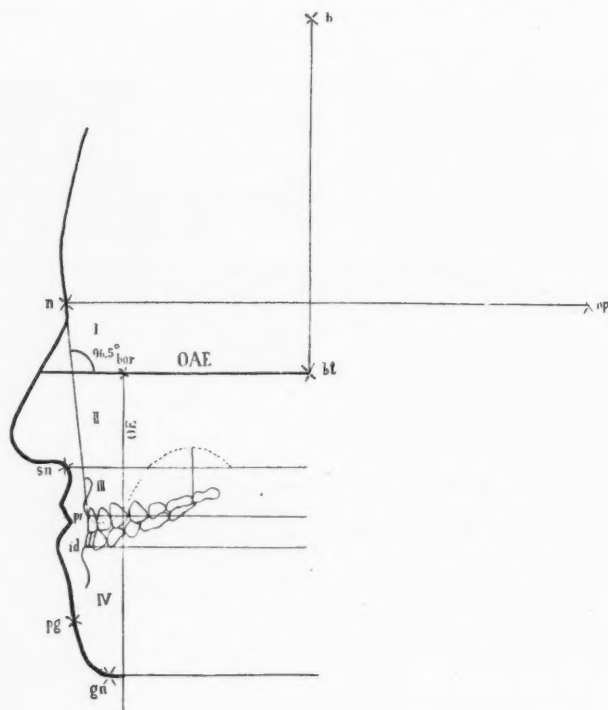


Fig. 28.

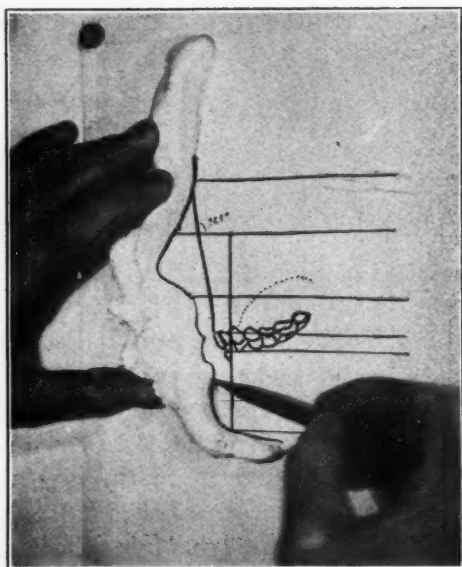


Fig. 29.

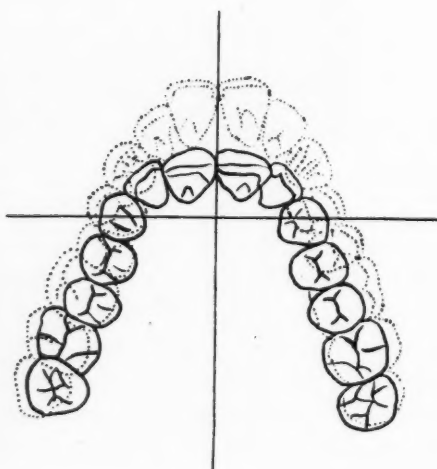


Fig. 30.

the models; the perpendicular distance of the interdental papilla (prosthion) between the central pair of incisors of the upper jaw, from the ear-eye plane; the perpendicular distance of the palate roof to the edge of the gums behind the first molars = height of palate.

With my new measuring method I am also enabled to define the longitudinal dimensions of the face, which are: first, the distance of the nasion (*n*) from the bitragial point (*bt*), and second, the distance of the prosthion (*pr*) from the bitragial point. The distances projected on the ear-eye plane are to be preferred to the rectilinear ones, because they are independent of the height of the face. The position of the first upper molars, which play such an important part in orthodontia, is fully and accurately accounted for if we

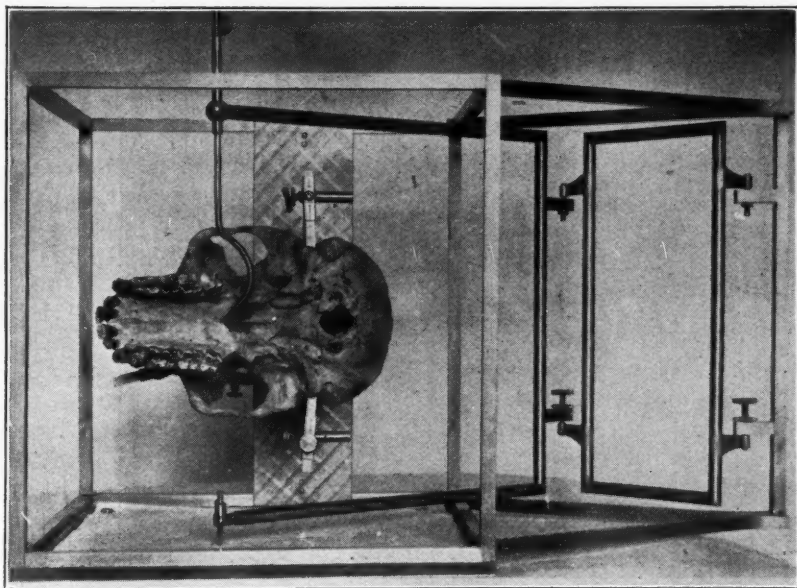


Fig. 31.

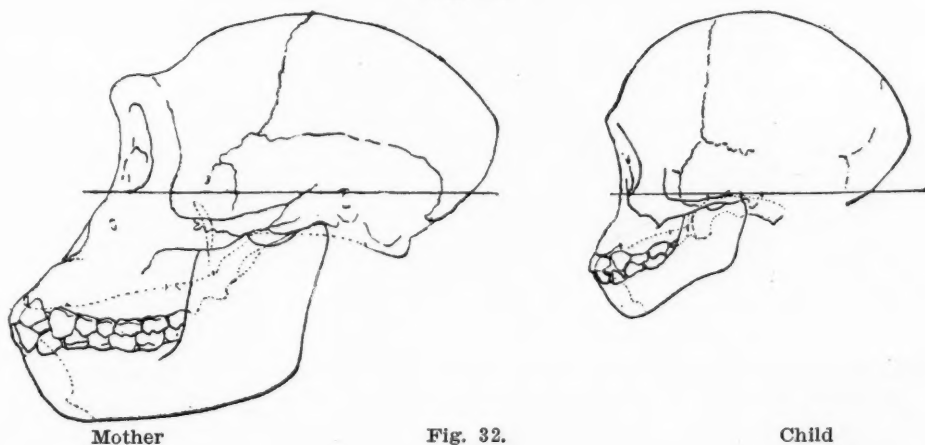


Fig. 32.

measure the distance of this tooth, as projected on the ear-eye plane, from the bitragial point. The longitudinal dimensions of the lower jaw which I measure are:

(1) The distance of the infradental (*id*) to the bitragial point as projected on the ear-eye plane.

(2) The distance from the pogonion (*pg*), the most salient point of the front chin relief, to the bitragial point as projected on the ear-eye plane. By this means I obtain an accurate representation of the relation of the mandible-alveolar prolongation to the chin.

If, furthermore, I register on the diagram the length of the head, nasion-opisthoecranium, which I have ascertained with the calipers, I obtain information on the dimensions of the pretragial and the posttragial section of the head. Immediately in front of this axis lies the temporomandibular articulation, so that our measurement comprises the whole jaw system. Although our measurements establish the profile points,—nasion, subnasal and gnathion, it may be desirable to get a complete drawing of the profile. For this purpose, previous to taking the measurements, the nasion, the subnasal point, and the gnathion, as also a few points on the median line of the nose are marked with a copying crayon; next the measures are taken; last a strip of plaster is

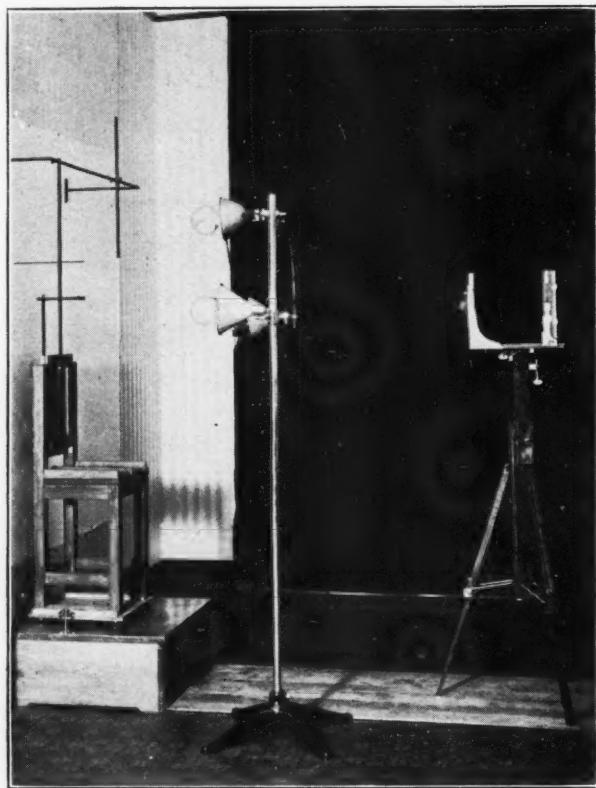


Fig. 33.

placed from the edge of the hair down to the chin along the median line. The profile negative is then cut along the median line, which is marked with the crayon points, and laid on the drawing so that the nasion point, subnasal point, and gnathion coincide, whereon the profile is traced with a pencil (Fig. 29).

With this stereograph the orthodontist can collect all the facts of his models. He is not confined to any definite points or planes. The small stereograph is at the same time an oclusograph, that is to say, it enables us to test with accuracy the results derived from our therapeutic treatment. The drawings of the dental arches, as obtained before and after the treatment, are placed in juxtaposition (Fig. 30). For the investigation of skulls, whether with an anthropologic or an orthodontic purpose, or in the interest



Fig. 34.



Fig. 35.

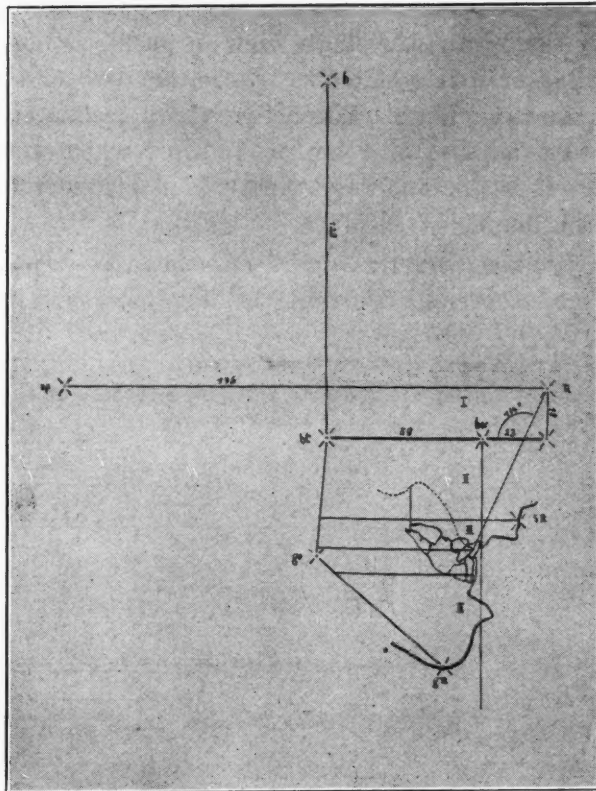


Fig. 38. L. Sch. 13 years.

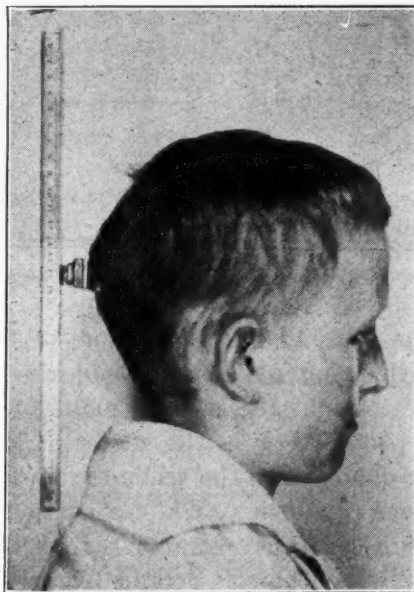


Fig. 39. F. K. 11 years.

turned about so as to preserve the same distance for the various normal poses. As I do not make use of the photographs for taking measurements, but only to study the features, a single view in profile is not sufficient. With the help of the adaptor it is possible to take either two or three views of the face on one and the same plate. When two views are taken, it is the profile and the full-face on a plate of 9 cm. to 12 cm.; when three, the one-third view is included. It is this one-third view which provides the most valuable information on the details of the face.

The subject is placed on the chair. His head is adjusted in the exact profile pose by means of an adjustable head-support and two vertical rods

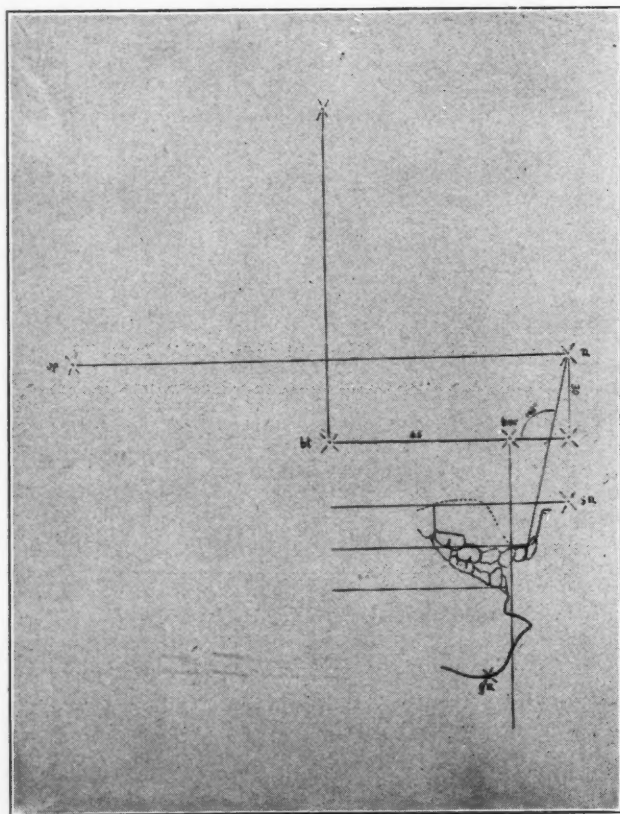


Fig. 40. E. K. 11 years.

which move on a frame fixed to the wall. One of the rods is fitted with a foot-rule, the other with a horizontal pin to locate the ear-eye plane. The two vertical rods serve to sight the median plane of the head (Figs. 33 and 34). I begin with the profile view in the center of lens—middle of cheek on the level of the ear-eye plane. For the second view the chair is turned about 45° , which yields the one-third view, while a further turn of 45° yields the full-face view. The subject thus remains seated during the operation of taking the three views. The chair is retained firmly in place in its various normal positions by means of a brass lever which snaps into a socket on the platform. As the tripod is fastened to a board connected with the platform, the distance remains absolutely unaltered. The triple set of pictures are

one-fifth, the double set one-sixth of the life-size. I particularly recommend the triple set, which is of the greatest value for collections (Fig. 35).

CONCLUSION

Our cephalometrical methods are of importance for the study of the constitution, which at the present time is to the fore in medical research work. This is proved by the book of the psychiatrist Kretschmer (Tübingen): *Physique and Character* ("Körperbau und Charakter"). Kretschmer maintains that the face is the visiting card of the individual's total constitution, inasmuch as it indicates its endocrine formula. In the place of the types of the French school: cerebral, respiratory, muscular, and digestive, he detaches three main types of bodily structure, designated as leptosome (asthenic), athletic, and psychical. He distinguishes various frontal face outlines, which nearly coincide with those of Williams. As the fundamental trophic characteristic of the asthenic type he indicates a long nose with a hypoplastic mandible; he defines the profile of the pure asthenic type as an angular profile, which is characterized by its oblique protrusion down to the tip of the nose and its recession from the tip of the nose to the end of the chin. Now it is well known that a profile of this kind is frequently conditioned by a certain jaw anomaly; namely, that of the Class II, Division 1, coupled with an open bite and a receding chin. For the athletic (acromegalous) type the characteristic is a high and protruding chin, such as is found in Class III according to Angle. The massive formation of the lower jaw cannot possibly be due to malocclusion of the frontal teeth in childhood and a corresponding strain alone; there must be an influence from interior secretion, in which the genital glands seem to play a part. Kranz was able to point to a hypertrophic mandible in the skull of a castrate. Now it is very important in orthodontia to evolve a precise conception of the various class types in Angle's system. Also the rachitic type, which not only shows characteristic forms in the dental arch, but is also remarkable through the height dimensions of the face, must be accurately determined by means of cephalometrical measurements on a great number of specimens. Fig. 36 shows the sagittal projection of a case, and Fig. 37 shows the sharp inclination of the line of level in three rachitic lower jaws. Fig. 38 shows the sagittal projection of a case of lues congenita. Specially interesting are the results of the measurements in cases of harelip and cleft palate. These cases are characterized by short longitudinal dimensions. Fig. 39 shows the projection on the median line, and Fig. 40, the profile view. The cephalometric methods, which are destined to furnish all the essential statistical data, cannot be dispensed with. With all that, it stands to reason that measuring in itself alone is not enough to make a real orthodontist.

DISCUSSION

Dr. Allen Holman Suggett.—I am very grateful to Prof. Schwarz for presenting to us such an interesting paper on a subject that is challenging the very foundation of orthodontic diagnosis at the present time. Simon's work in anthropology, proving the inadequacy of the present classification, and presented to the American Society of Orthodontists at the Kansas City meeting was rather startling. This investigation by Schwarz is going a step further in cephalometries and takes in the length and width of the head and above all the points on the profile; nasion, subnasion and gnathion.

He includes the chin and can take in the whole of the mandible in his models. This is of extreme importance in diagnosing all cases of abnormal mandible. This method gives us an accurate, scientific picture of those cases of maxillary asymmetry which we have not been able to record unless we made plaster masks of the whole face.

This research by Prof. Schwarz, approaching anthropology from a different angle from Simon's may be of great assistance to many who have had difficulty in accepting Simon's work. It is like the many different conceptions of Heaven. Many people with weak eyes who rather shrink from the glitter and glare of golden streets and dazzling pearly gates, accept with enthusiasm the Mohammedans' heaven in a beautiful oasis with green meadows filled with lovely dancing maidens.

Those were wonderful models he showed you depicting cases of extreme protraction and retraction, contraction and distraction, abstraction and attraction. There were cases where the occlusal plane inclined from the E. E. plane more than 20 degrees. There were others where the orbital plane passed from 5 to 10 mm. distal to the cuspid, and others where it passed almost that much to the mesial, and yet they were diagnosed Class I, II and III which does not tell the whole story any better than to diagnose myocarditis as a fever. After we have found out what the trouble is by these very scientific methods, it is very important to describe it in accurate terms.

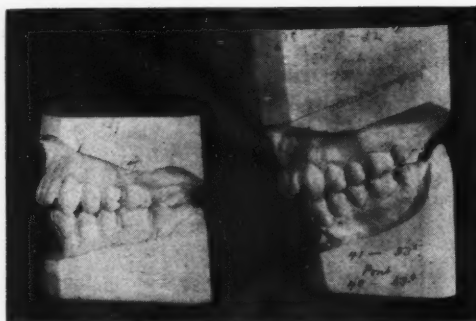


Fig. 1.

Orthodontists will not be satisfied much longer with a diagnosis arrived at by means of an ordinary model that shows only the relation of one jaw to the other. Occasionally this diagnosis was supplemented by a snapshot taken out in the garden with the patient demurely looking at a frog in the pool. This pose would represent the weak or receding chin. Then many years after when the malocclusion was or should be corrected, another picture was taken with the patient standing on a bridge, eagerly looking at a wild goose high up in the sky. This picture would represent a strongly developed chin.

For all practical purposes, the two pictures might have been taken within five minutes of each other, and would show either development or the reverse, depending upon which picture was shown first.

Orthodontics has advanced with rapid strides in the last twenty years and has accomplished some marvellous results, thanks to its clever mechanics. Only very lately we have begun to realize that many of the problems that have been vexing us for years have already been worked out by other scientists and all we need is to apply their results to our work. The physiologists are ready to tell us a great deal about glands. The biologists have told us a great deal about development and will tell us more. The histologists are telling us some very interesting things about the action of bone and tooth roots under stress. And now the anthropologists say: "Why can't we answer some of your questions? Your wise men are forever wrangling about teeth being too far forward or backward, up or down. Let us measure them for you. We have been measuring size and shape, curves, angles, and fossa of the head for years and years, until we have made an exact science of it. In order to measure the relation of the teeth to the head, you need three planes from which to measure. For many years, we have been using two, namely, the E.E. plane and the R.M. plane, and

from the E.E. plane we can measure up and down and from the R.M. plane, we can measure in or out. It is now up to the orthodontists to establish a constant plane from which to measure forward and back."

Dr. Simon came to the rescue after eight or ten years' research, with the orbital plane, and devised a simple method by which any orthodontist can take an impression in about seven minutes. From this impression a gnathostatic model can be made that will show the location of the teeth in relation to the head. To supplement these head measurements, the same man devised the photostatic picture which is always taken with the head in the same position and at a definite distance so the picture is exactly one-fourth life size.

Prof. Schwarz has gone further and devised a stereograph which enables him to project on paper the lines of the model in its exact dimensions and proportions, as he has just pointed out to you. Cephalometric methods and orthodontic diagnosis must go hand in hand. Fig. 1 shows two models of the same case. The ordinary model tells you very little as compared with the gnathostatic model made with the aid of cephalometric methods. The occlusal plane is not horizontal as shown on the ordinary model but pitches downward at an angle of 14° from the horizontal. The mandibular cuspid looks almost vertical in the ordinary model, but the gnathostatic model shows it is inclined 45° and it shows the left side is 3 or 4 mm. lower than the right. The apical base of these anterior teeth is so far distal that it is not possible to develop enough bone to allow them to assume their proper position.

This brings us to the question of extraction. If ever there was a case of justifiable extraction of some of the teeth, it is indicated here and so demonstrated by cephalometrics. The photostatic picture confirms it. The orbital plane should pass through the cheilion and the gnathion, but in this case there is a lack of development.

In this slide cephalometrics show that all the teeth in the left model are in retraction, and those in the right model are in extreme protraction.

I heartily welcome Prof. Schwarz and his cephalometric methods. He is materially helping us to place orthodontic diagnosis on a scientific basis. I thank him for his timely paper so ably presented.

Southern Society of Orthodontists

The next meeting of the Southern Society of Orthodontists will be held at the Battery Park Hotel, Asheville, North Carolina, on February 28, March 1 and 2, 1927. A splendid program is assured. All ethical members of the American Dental Association will be cordially welcome. For further information address Dr. Oren A. Oliver, Secy.-Treas., 440 Lambuth Building, Nashville, Tenn.

ON THE NECESSITY OF GNATHOSTATIC DIAGNOSES IN ORTHODONTIC PRACTICE

BY DR. PAUL W. SIMON, BERLIN, GERMANY

IT IS not my intention, in this paper, to describe the technical details of gnathostatic impressions and models, or of photostatic photos; I can refer you to the numerous lectures and demonstrations I had the honor to present in several of the large cities of the United States in the spring of 1924, as a guest of the American Society of Orthodontists. The paper which I then presented in Kansas City, Missouri, has been published in the *INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY*, and since the Society has decided to publish an English translation of two of my books, anyone interested in this subject may gain the necessary technical information therefrom.

However, for those of you who may want an objective presentation, I will give a practical demonstration, so that the instruments employed can be carefully inspected.

The aim of this paper is to emphasize the principles upon which the new methods are based; to show some of the progress which they have engendered; to discuss ultimate objections and, finally, to disprove the latter.

Nevertheless, it may be useful to state briefly a few elementary rules of the gnathostatic system.

We no longer consider the denture as an isolated body, but as an anatomic and physiologic part of the head, and therefore study its exact connection with the skull by measuring the proportions of the denture in its relation to three planes of the head. These three planes stand at right angles to each other and are as follows:

1. The Frankfort horizontal plane which passes through the eye-points (orbitalia) and the ear points (tragia).
2. The orbital plane, which intersects the eye-points and stands perpendicular to the ear-eye plane.
3. The raphe-median plane, which intersects two occipital points of the raphe-palati, perpendicular to the ear-eye plane.

These planes are not natural anatomic planes (which we do not find at all on the irregular formed skull) but artificial ones, which can be represented by straight sections. Details as to the reason these planes have been chosen as especially useful and how they can be marked on the head cannot be given here for lack of time, and I would ask you kindly to read them in my papers.

We study the dentofacial relations by making two reproductions: one of the denture, i.e., the teeth, alveolar process and palate; and one of the

facial part of the head. Both reproductions, of course, must be marked according to the three planes.

We get the first by the gnathostatic model, which is shown in Fig. 1. The upper model base is identical with the ear-eye plane, the orbital plane is represented by the perpendicular line, drawn around the model, and the raphe-median plane is also represented by such an outline.

Fig. 2 shows the gnathostat fastened on the head of the patient in order to take the impression. The other necessary instruments and their uses follow: first (Fig. 3), the orbital marker, to project the orbital plane upon the palate of the impression; the symmetrograph (Figs. 4 and 5), to draw at right



Fig. 1.—Gnathostatic model.

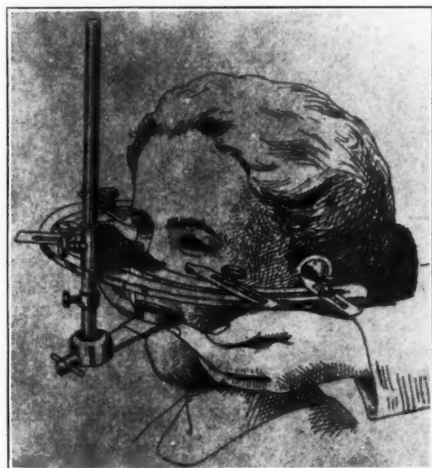


Fig. 2.—Gnathostat applied on the face in taking an impression.

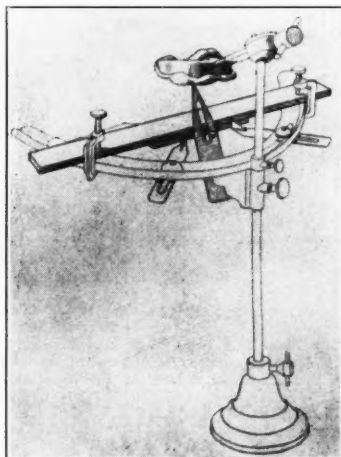


Fig. 3.—Orbital marker.

angles the orbital and raphe-median plane, with the sliding compass (Fig. 6) to measure symmetry or asymmetry of the dental arch, and finally the diameter (Fig. 7) to represent the upper and lower occlusal lines and transverse and sagittal sections of the palate in the form of curve diagrams.

Figs. 8, 9 and 10 show such curves of several cases, projected one into the other so that one can make comparisons.

The cast of the upper impression with the help of a plate (Figs. 11 and 12) is used instead of the pointer-bow, and on the lower impression a base is made parallel to the upper base, and at a distance of eight cm. from it. We use a little table with three legs of corresponding height for this.

The second reproduction (Figs. 13 and 14) is the photostat photo of the patient. The photograph is taken exactly in one quarter of life-size, and in such a way that the photo-plane corresponds to the sagittal median plane. The two other planes are represented as sections by connecting lines through the ear- and eye-points, and by a perpendicular to the eye-point. Further, the corpus and the ramus ascendens of the mandible are represented by lines joining the point on the chin (gnathion) to the point on the jaw-angle (gonion), and to the ear-point (tragion), so that one can measure the distances. Fig. 15 shows the photostatic apparatus.

We use, therefore, for the diagnostic analysis of each case the gnathostat model with the curve diagrams, and the photostatic photo. How is the diagnosis made with the help of this material? To explain it, I must at first make some remarks referring to the normal denture, or the dental norm.

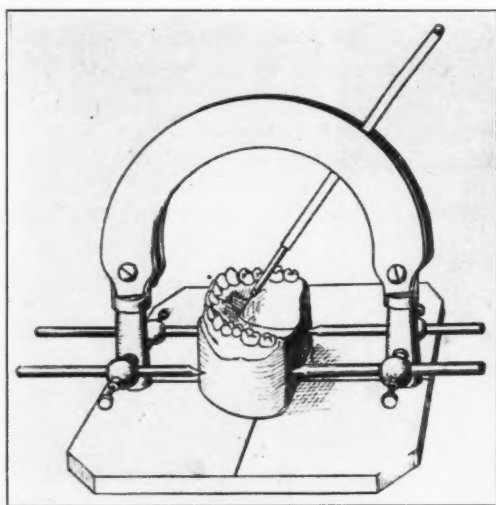


Fig. 4.—The symetrograph.



Fig. 5.—The symetrograph.

If you compare a number of gnathostatic models and photostatic photos with each other which, in a scientific sense, is only possible on a basis of exact localization, you will find (measuring from each plane) a large number of variations. No two cases ever resemble each other in their entirety—not even between brothers and sisters, or even between identical or true twins—though with these nearest possible relatives resemblances are often very marked. I can best demonstrate this fact of individual variation by presenting examples.

For instance, let us consider sixteen dentures which present anatomically faultless conditions; all the teeth are present and in correct occlusion. In a superficial view these dentures resemble each other very much; a layman could scarcely find any differences, and if we would make customary dental casts of them these differences would be even less discernible. But all this is changed the moment we begin to measure the gnathostatic models, because exact measurements are possible. Nevertheless, one simple measurement is possible even on the customary models; namely, that of the width of the dental arches, which is a very remarkable symptom, and also very important in orthodontic therapy. Let us measure the transverse distances between the

first molars, and between the first premolars, of the sixteen cases. I have arranged these in two curves, as shown in Fig. 16. The upper curve shows the distances between the molars, arranged according to size or amount of distance, from 45.5 to 53 mm. The lower curve gives the distances between the premolars, not arranged according to size, but in such a manner that each measurement is placed under the measurement of the molars to which it belongs, that is, of the same case. By this very irregular curve we note that one cannot speak of regularity, or great resemblance of the arches, even in these so-called "normal" dentures.

Now, as to the other symptoms of the denture, it goes without saying that we find practically the same variations.

Therefore, we stand before this fact—and we must grapple with it—that even among the best and anatomically most perfect dentures of a number of individuals, there are extensive differences in their forms. It is not admissible to call an anatomically correct denture a "normal" denture,

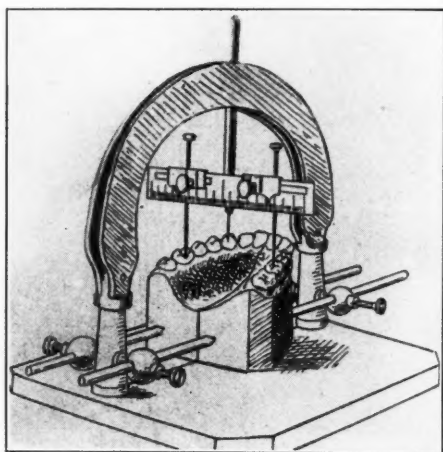


Fig. 6.—Sliding compass.

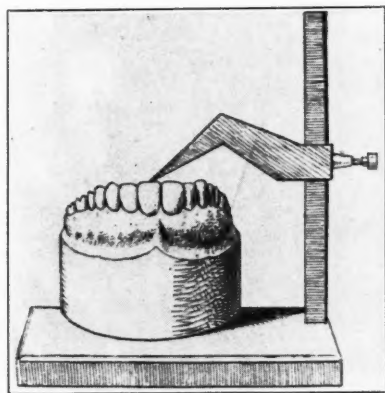


Fig. 7.—The diameter.

simply because a particular denture at one time shows this formation, another one a variation, and that therefore it would be unsafe to determine a norm.

The extraordinary important consequences emanating from this statement, especially for orthodontic practice, can be demonstrated with the same, simple example of arch-breadth. In most anomalous cases we find arches which are too narrow; they must be widened, *but how much?* A glimpse at the curves (Fig. 16) shows that nature, even with her quite faultless dentures (which may be falsely called "normal" dentures), does not answer our question differently: "Do as you like, for I also do as I like!" Indeed many practitioners seem only to acknowledge this one solution of the diagnostic problem, i.e., arbitrariness. But a distinction must be made between the apparent arbitrariness of nature, whose efficiency our finite minds are not able to penetrate, and the real arbitrariness of the practitioner, who does not fully understand her but who wants to impel her.

Now, what is the position of the gnathostatic system on this question of a dental norm? This is easy to explain. Its position is a biometric one, i.e., it tries to find out through extensive and exact measurements, whether these

differences in nature (just shown in one single example) are planless and unsystematic, or, if in some way a systematic purpose, a natural law, can be discovered.

This problem is attacked in a strictly scientific manner, avoiding all subjective opinions and dogmas. Our procedure is as follows:

We are collecting as many individual persons as possible, who belong to the same population-center and who have grown up under a similar environment; and they must have faultless dentures with anatomically correct occlusion. Their gnathostatic models and photostatic photos are compared with each other in such a manner that the symptoms, or characteristics, which are most important for our judgments in practice, are ascertained and measured from the three planes, namely, in three dimensions. We thus find a great many variations, corresponding to our former example of arch-breadth. The orbital plane, for example, may pass through the cusps of the upper first premolars, or through the mesial inclined planes of these cusps; or through the cusps of the canines, or through the mesial, or distal, inclined planes of

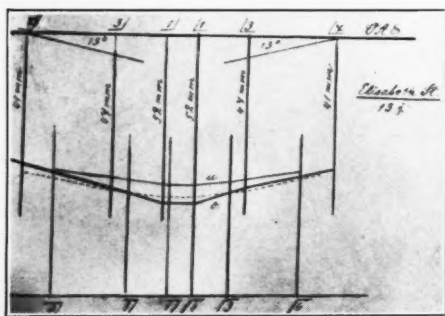


Fig. 8.—Curves on graphs.

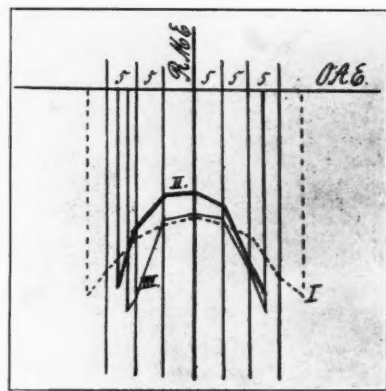


Fig. 9.—Curves on graphs.

their cusps; or through the incisors, and so forth. A view of the tables where the results of these measurements are collected shows, that this symptom also varies considerably. But we find very few in which the orbital plane passes through the incisors, and very few in which it intersects the premolars; much greater is the number in which the orbital plane lies within the canines; in the greatest number it passes almost exactly through the cusps of the canines. It, therefore, seems that we have no arbitrary and irregular but a systematic arrangement, which is particularly impressive, if one arranges the results in a graphic curve, such as is shown in Fig. 17. You will note the three teeth which must be considered: the lateral incisor, canine, and first premolar. The vertical lines indicate the various possible intersecting lines of the orbital plane in these three teeth and the horizontal lines the distribution according to percentages of the 137 persons examined by Herzog. You will note that in 45 per cent of all these cases the orbital plane passes exactly through the cusps of the canines; in 32.4 per cent it passes between the cusp and the proximal surfaces—15 per cent mesially and 17.4 per cent distally; that in 5 per cent it passes through the premolar, and through the incisor not at all.

Considering the results as a whole, in about one-half of the cases the orbital plane passes exactly through the canine cusps, and in one-third it passes near by.

In biometrics there is a law known as the law of Quetelet, by which somatic symptoms (for example, the stature of the body, the girth around the chest, the weight of the brain, etc.) of individuals are compared and are found to be very variable. Nevertheless, their distribution is rather systematic, which we call the "binomial distribution of the variants." A great many persons were included in Quetelet's examinations for an average of the examined symptoms, and the more the measure of the examined symptoms deviates from the average to either side (the plus and the minus side) that is, the more extreme the variants are, the smaller is the number of their frequency.

It cannot be doubted that this average, which must be reckoned for every characteristic (also of the denture) with the aid of exact methods of measurement, represents what we have always designated by the term type. But this type is identical with the norm. The law of Quetelet makes it

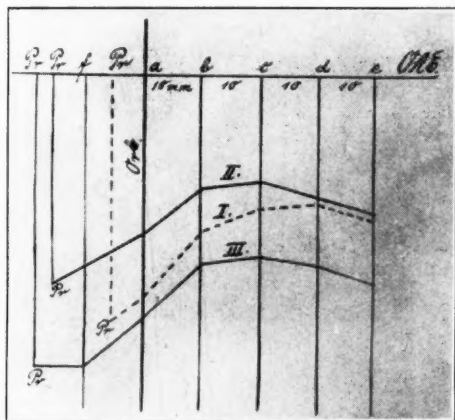


Fig. 10.—Curves on graphs.

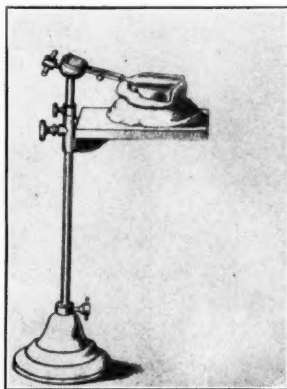


Fig. 11.—Cast on plate with 8 cm. table.

evident that nature, in spite of these multiple variations, aims to produce in each population group again and again a certain conformity, to maintain a normal, or average, type. We can comprehend the origin of this normal type quite well, though not all of the complicated paths of nature have been thoroughly examined, and possibly never will be entirely. In all probability, the normal type is a result of inheritance for thousands of generations on a basis of adaptation to the conditions of life. We cannot enter into full particulars here, but a great many facts gleaned from the sciences, which deal with inheritance and the constitution, support our opinion in this regard.

Specialists often use the word "normal" when speaking of the *normal* size of the body, or the *normal* weight, etc. Of course, they have a certain idea concerning it, and it may be that each one of us has certain opinions regarding the *normal* in our race, our population, and also our family. It is natural for us to have these opinions; they live in our subconscious mind, but they are hazy and subjective; they are like a fog without definite contours, as soon as you try to formulate a definition. Biometric progress, based upon a statistical study of variation, *consists of an exact formulation of the normal type on a scientific, objective basis.*

Now, I have given a short sketch of the task of the gnathostatic system, which it has partly solved. We must calculate the normal denture type of a population-center from the averages of its variation-curves of the most important symptoms and qualities, on the basis of the three-plane system and with the aid of measure-instruments. If this "normal" denture has been actually determined (and I wish to state that this has been done regarding its more important characteristics), then a practical diagnosis of its anomalies can be made. In my books I have described rather extensively how this new gnathostatic procedure is used, with the aid of gnathostatic models and photo-static photos, and with the help of a logical classification of dental anomalies; hence, I need not enter into minute descriptions here.

I wish here to speak of the objections which have been raised against the system, and I shall try to disprove them.

It may be said that the making of the models, curves, and photos require much time and cause a great deal of trouble. This is not the case, however, as everyone who has become intimately acquainted with them will testify. But

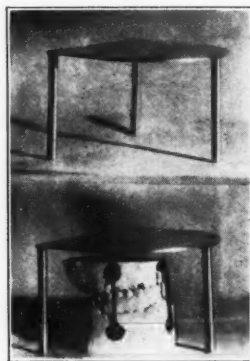


Fig. 12.—Cast on plate with 8 cm. table.

even if it were true, every conscientious practitioner will want to use them if he is convinced of their value and necessity.

Now, these procedures do not inconvenience the patient; in any case it is less than an x-ray examination, nor is the subsequent diagnosis difficult. Quite the contrary; the new procedure is clearer, more comprehensible and more extensive than the old method. We orthodontists, who have always moved malposed teeth in the three directions of space, very quickly comprehend that it is useful and necessary to make our diagnoses in three dimensions.

Sometimes the criticism is made against the cephalometric method, that the measure-points on the head cannot be determined exactly. This is partly true. If one has practiced a definite, and systematic technic in marking these points, the unavoidable inaccuracy is so small that it has no significance on the correctness of the diagnosis. But our critics who make this charge should not be so inconsistent, because they, at the same time, lay great stress upon the "constancy" and "fixity" of position of the first permanent molars. It has been definitely proved that they are very inconstant, that they are not fixed, and so one must not say that they are in correct position; they are in an organ which perhaps goes through the most complicated development of all organs of the body, and which is exposed to very many external influences.

Another objection refers to the above-mentioned normal denture, which is ascertained biometrically; it is said that its form is adequate as to morphologic relations, but that it does not take "normal function" into consideration. It is claimed that in a forward movement of the mandible, such a denture would show apertures in the buccal teeth, resulting in an imperfect comminution of food. I have observed that these objections emanate largely from prosthodontists, not orthodontists; from men who are primarily interested in articulation, and who forget that their problem does not concern itself with natural dentures which are composed of fixed teeth, but artificial dentures where other conditions prevail. We need only examine an anatomically faultless denture (of course of an individual who belongs to a civilized nation, not of an Australian negro, or Papuan) and we will practically always observe these



Fig. 13.—Photostatic photo.

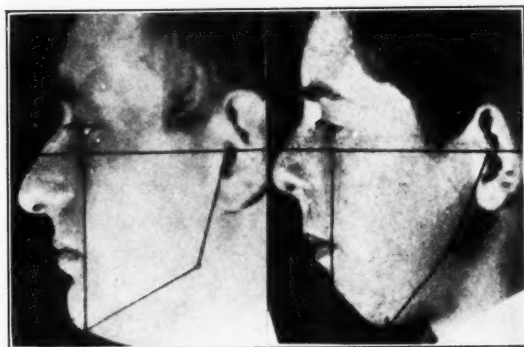


Fig. 14.—Photostatic photo.

apertures. A study of the physiologic process of biting and chewing in natural dentures and of the food of a civilized nation will disclose that the form of our biometric "normal" denture is very useful and represents the optimum, and that every other form would be perhaps less effective. Much more might be said about this subject, but for lack of time we must pass on.

In conclusion, I wish to mention one more criticism of gnathostatics as a method of measuring but which in reality is only an objection to the biometric norm, or against the necessity for a norm at all. These opponents demand an "individual therapy" instead of the "schematic therapy" which the norm suggests. Recalling that one cannot have any plausible objections to gnathostatic models, etc., I would remind those who pretend to be able to measure a denture without cephalometric measurements that they must prove, first, that they are endowed with supernatural ability. Personally, I believe they have not sufficiently recognized the difference between "subjective" and "objective" confirmation.

The demand for an individual therapy is not only an attack on gnathostatics, but assails all our therapy up to the present day. Let me first explain what is meant by "individual therapy," notwithstanding that such an explanation is difficult. Apparently, one must reform the abnormal denture of a patient in such a manner that it will correspond with the particular individual nature of that person. One is expected to believe that for each person there is only one fitting, appropriate, "individual-normal-denture," differing from all others, but that it merely has not developed, because certain disturbances, or "etiologic factors" exercised pernicious influences. Therefore, it is necessary, first of all, to recognize these factors and to remove them. In this sense, an "individual therapy" is connected with the "causal," or "etiologic." And here I must call your attention to a fundamental error: the identification of anomaly with disease! A person who has no other infirmity than an abnormal denture is enviably healthy, and his denture (that means teeth, gums, jaws, muscles, etc.) are by no means diseased. With a sick patient it is indispensable to find the cause of his suffering and to remove it, otherwise he will not get well. With a dental anomaly it is only useful to search for causes for theoretic reasons; it is absolutely useless for treatment purposes.

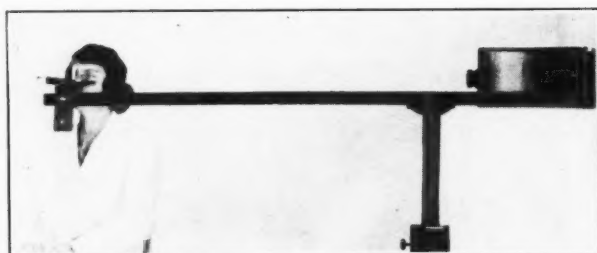


Fig. 15.—Photostatic apparatus.

Or, are there perhaps special appliances for rachitic anomalies, and others for *inherited* anomalies, and still others for those anomalies which are due to finger sucking, etc.?

A causal therapy cannot exist if we remove the anomaly by artificial, mechanical appliances, i.e., by a soft force,—nevertheless by force; but only if we operate in an internal and organic way, e.g., with an abnormal system of glands and thus obtain an internal spontaneous transformation of the jaws. This seems utopian to me, at least for cases of anomalies which are marked and established. It is, of course, quite another matter in prophylaxis, or the prevention of anomalies; but it is not appropriate to discuss that subject in this connection.

And now that we have established that a "causal therapy" is an error, what remains of "individual therapy"? The gnathostatic system suggests that we transform an abnormal denture in such a way that it corresponds as nearly as possible to the biometric norm. The following train of thought suggests itself: Since we cannot possibly know what form a patient's denture would have assumed during an undisturbed development, we provide him with one which is the most suitable in every relation, the most appropriate to his race—in the fictive sense, *as if* this denture had developed all by itself in an undisturbed manner.

A certain pattern is thus at hand, inasmuch as the real individual is thus neglected in favor of the general. And what is the condition of the individual? If you reflect upon the genesis of a denture, from its very beginning—which means from the germ-cell—and if you take into consideration all of the infinitely complex influences and conditions of inheritance, of intra- and extrauterine existence, you will come to the following conclusion: the particular denture found in an individual prior to orthodontic treatment, regardless of its particular kind of deformity, is the individual denture; it represents the last effect of endo- and exogenic influences to which this person has reacted individually. And every orthodontic alteration means, under all circumstances and even if desirable and corrective, an arbitrary reshaping of the individual form. This is only justifiable if it is patterned after a higher, better model which is superior to the individual.

And this model is the biometric norm.

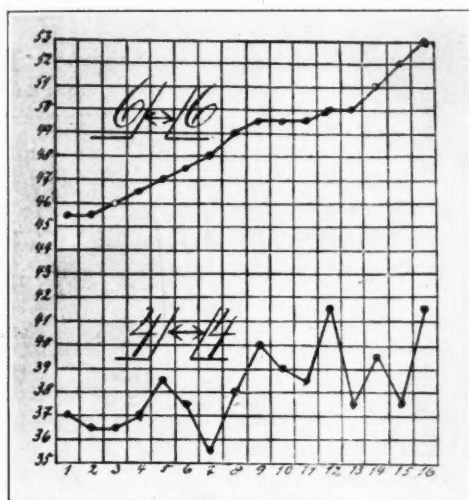


Fig. 16.—Two curves of 16 cases.

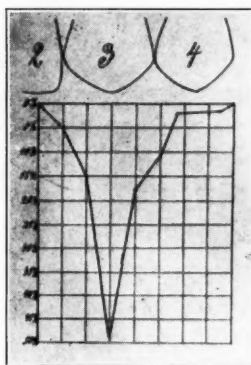


Fig. 17.—Curve showing position of cuspid.

There can be no individual therapy! It is unknown, even in the general therapeutics for diseases. In every pharmacology you will find a great many remedies which are recommended quite schematically for abstract diseases, without any knowledge of the diseased, single individual. But there is an individualizing therapy which depends upon certain changes of the general therapy by taking certain peculiarities of the patient into consideration.

It goes without saying that this is also true in gnathostatics. I need merely mention the age of the patient. A total maxillary protraction, for example, can be treated without extraction up to the tenth year by moving the buccal teeth distally. Later in life one must eventually extract the first premolars; or, if one does not want to resort to that method for "individual" reasons, then the protraction must remain, or be left untreated. Every experienced practitioner knows how to individualize, but he must first acquaint himself fully with the general, i.e., the superindividual method.

Recently, an author tried to define individuality on the basis of inheritance. Every child is said to reflect in his bodily structure the form of his

parents, but only of his parents, not that of other ancestors. The occurrence of an anomaly is then explained by assuming that the parts of the parents did not exactly correspond to each other. The possibility is granted that exogenic conditions may cause anomalies, but their influence is minimized. This doctrine is a mixture of subjective opinions, and its author tries to found it on scientific material; its preparation and utilization are very imperfect. Nevertheless, an "individual therapy" is abstracted from it, the ideal demand of which is as follows: the parts of the jaws of a child which resemble the corresponding part in the jaws of one of its parents must not be changed during a treatment, since they form a quite original component of the individual, and are therefore the "individual normal." This demand would only be justified if the parents were always ideal forms which, unluckily, is not the case. The inventor of this doctrine unfortunately forgets that the dentures of the parents have for decades been exposed to the form-changing influences of function, life, etc., that they do not in the least show the real, inherited form—the genotype.

For lack of time I shall not refer to other objections. In any case, this attempt at an etiologic foundation for diagnostics and therapy possessed one good feature, namely, it clearly shows the utter impossibility of such a doctrine.

By way of summary I wish once more to express my point of view. I believe it necessary for every orthodontist to use cephalometric, gnathostatic methods in his practice, for with their help it is not only possible to judge the denture in three dimensions—which is the only right way—but the dentofacial relations are also considered in an exact manner. The personal, subjective conception is now replaced by the striving for objectivity; orthodontics thus emerges from a state of unworked empiricism, of personal experiences and preferences, into a truly scientific vocation.

I also regard these methods as indispensable for etiologic and other similar investigations, because in this domain an especially objective clarity and exactitude are demanded.

The determination of a dental norm on a biometric foundation seems indispensable and corresponds with the methods employed for many years in medicine. Only such a norm is free of probability hypotheses, for it does not depend upon future suppositions but irrefutable numbers. Only in this way is it possible to define anomalies, their degree, and their localization.

Gnathostatic diagnostics is not a gnathostatic therapy. Every practitioner is left free to determine the method and aim of treatment, and to draw upon his own experiences. Gnathostatics merely tries to grasp in a scientific manner that which it is possible to grasp scientifically. Beyond it there lies a wide field for medical intuition and orthodontic art. But the biometric dental norm, determined gnathostatically, is our safest and most indispensable plan, an indispensable model for our treatments. We may modify and individualize, if we have good reasons for so doing, but in most cases this will be unnecessary.

Above all, I regard these methods as useful for putting orthodontics on a broader basis. Our studies in anthropology, biometrics, heredity, and of the

human constitution and other important matters no longer remain a beautiful wish, about which only a few are concerned, but a necessity of everyday practice for the extension of our knowledge. Now we have the means and they are not difficult to apply.

I thus express the hope that many new aspirants will join with old friends, to quicken orthodontic proficiency, to attract desirable and devoted students of science, and that our worthy specialty may progress firmly.

DISCUSSION

Dr. B. E. Lischer.—It is quite generally conceded that dentofacial deformities are complex, morphologic deviations, which frequently extend beyond the immediate boundaries of the human denture. Thus, the jaws supporting the alveolar process, the mandibular joints, and sundry external facial features may be involved. To provide a rational scientific treatment for such anomalies we are obliged to make an accurate, differential diagnosis; we must determine the difference between the existing denture of the patient (in all its parts) and the condition to be established before beginning its correction.

A mere intraoral method of diagnosis is inadequate in many instances, because such a procedure does not provide us with a comprehensive picture of all the deviations from normality which may present in a given case. The customary dental plaster casts never reveal extreme deformities of the jaws and face which may conjoin, and which may seriously affect our prognosis and treatment.

For this reason many practitioners have sought additional guidance in critical studies of the external facial form. Many writers and investigators of importance have emphasized the necessity of a further development of diagnostic methods. Kingsley, Farrar, Case, van Loon, and many others were conscious of this deficiency in our methods. Angle, the best exponent of the intraoral method, also resorts to a restricted use of this concept, e.g., Class II.

Some of the simpler kinds of anomalies can be treated successfully on a basis of a mere intraoral diagnosis. Again, the number of patients seeking orthodontic treatment in many of our larger cities is usually greater than the limited number which the specialists in these centers can accept for treatment. This permits resort to a process of exclusion, which has been termed "selective orthodontics," a process by which the extreme deformities are largely eliminated. This has led men to believe that a further development of diagnostic procedures was unnecessary, or at least unimportant.

In the current (August, 1926) number of the *Dental Record*, Mr. George Campion, of England, in a discussion of a paper by Dr. D'Alise, of Italy, entitled: "The Etiology and Pathogenesis of Angle's Class II Malocclusion," presents the following argument. "He had come, as the result of some years' study, to challenge Angle's classification. He believed it to be one of those superficial generalizations which we all of us came to and which the whole of human history is full of: a generalization which is founded on and involves a scientific examination of all the facts and which, as our knowledge accumulated, we discarded. That, he believed to be what would happen with the Angle classification. He wanted to put one question to those people who believed in it. He asked them to take those cases of postnormal occlusion (what Angle called Class II)—there were four possibilities; in any one of those cases the malocclusion of the teeth might be the result of the whole of the maxilla being too far forward; it might, in the second place, be the result of the upper teeth in their sites and sockets in the maxilla being too far forward; the third possibility was that the mandible might be, as a whole, too short, and consequently the whole of the lower arch too far back; and the fourth possibility was that the mandible might be normal in size, but the lower arch of the teeth might be somewhat too far back in the mandible. He thought those four possibilities should be apparent to everyone. He wanted the Angle people to investigate 100 cases, and to give the percentage of each possibility in those 100 cases. When that had been done, or when a serious attempt to do that had been made, then the illusions of Angle's classification would become apparent. To do that in-

volved a recourse to anthropometric methods; and until that shall have been done—and it would not be done for some years—he said that Angle's classification was based upon a series of presuppositions. Progress in knowledge was arrived at very largely by a criticism of what our fathers believed to be the facts. We found on closer investigation very often that what previous generations believed to be the facts were not facts, and that he believed to be what was going to happen in the case of orthodontics."

Campion's arguments are an attempt to further the development of our methods of diagnosis, to make a finer differentiation possible. It is precisely what the writer had in mind in his Atlantic City paper before the American Society of Orthodontists (1921) when he presented a discussion—"On the Pathology and Diagnosis of Distoclusion."

In 1922 Dr. Simon published his book on "Fundamental Principles of a Systematic Diagnosis of Dental Anomalies." This book contains an explanation of a new classification based upon gnathostatic methods of investigation and to many of us is a satisfactory, logical, and practical solution of our diagnostic problems. It makes it possible for every one to learn the art of differential diagnosis and Campion's hopes are entirely fulfilled thereby.

Gnathostatic diagnostic methods are but the fulfillment of the vision of the pioneers, the realization of a dream which has "stirred our reason and troubled our minds these many years, the fruition of an ideal to whose lure of beauty and the call of its truth" van Loon, and the late Dr. C. S. Case of revered memory, gave their fullest measure of devotion.

I believe it to be an epoch-making contribution to orthodontic knowledge; just as Darwin made all thinking since his day follow his method, so all future orthodontic diagnostic procedures must take cognizance of Simon's methods.

Let us be patient in judging the opinions of our colleagues in this period of transition; Campion has well said that it will take years. But I am firmly convinced that gnathostatic methods, or their equivalent, are a necessity in daily practice. Since translating his book (which will be published this month) I have become more certain of its verity than ever before. And it will take time for those of our colleagues who have accepted these methods, to finish a sufficient number of cases to provide the necessary evidence for which its more general acceptance is waiting. But all this is coming rapidly, and I agree heartily with Dr. Simon's arguments of today.

Dr. Watkin.—And one thing—it has not been mentioned—is in connection with Dr. Simon's paper. He said we wanted to expand the jaw, but how much should it be expanded? Nothing has been said about the influence of the size of the tongue. I think that is an important factor. If there is a small tongue, there is no use expanding the jaw and expecting it to stay expanded after removing the expansion appliances.

Dr. A. Wolfson, East Orange, N. J.—Mr. President, Ladies and Gentlemen: I want particularly to address my remarks to Dr. Simon's presentation. It is a little unfortunate that he has not been able to show his slides as well as he might have if the equipment were more efficient. However, many of us had the opportunity of seeing his work two years ago when he was present in New York, and it was at that time that my interest was keenly aroused in what appeared to me then very superficially to be a panacea in diagnosis.

I asked him whether he felt his findings, namely, that the canine tooth in most cases lies in the orbital plane, would also pertain to the type of patients we have to treat in this country, and his reply was that that would not be a safe criterion; if we wanted to use his scheme of diagnosis, it would be necessary for us to conduct a series of investigations to check up and find out whether those same findings were true with the type of patients we have in this country.

In order to carry out his suggestions, I went to two different museums and selected twenty skulls of American Indians and forty skulls of Hungarians, coming from a European collection. All of these skulls had normal occlusion. I made the measurements just as Dr. Simon has done, under very careful supervision, and have found that in every one of these skulls the canine tooth was invariably in advance of the so-called orbital plane. The amount it was in advance varied from two millimeters to eighteen and one-half.

Of course, that in itself was enough to dampen my ardor, let alone permit me to go on using the gnathostatic technic in my own practice, because if all of these skulls I have meas-

ured have normal occlusion and still show that much variation, how can we hope to use any arbitrary anatomic landmark as a criterion in treatment?

Let us assume, without attempting to be facetious, that if these normal skulls with their normal occlusal relations for some reason suffer from arrested development of the mandible and came to us for treatment, the arrest being only in the mandible and not in the maxillary bones—if we were to attempt to make a diagnosis according to Simon's scheme, we would have to move the maxillary teeth back, and yet, in looking upon these skulls, they seemed to have normal occlusion.

The very fact that there is a variation in one or two skulls out of a large collection would tend to show that any anatomic scheme such as the orbital plane might be a pretty fiction, as he put it two years ago, but would hardly be safe to use. Then, again, if we could hope to develop an anatomic truth for a highly selected group of individuals, we must keep in mind that there is no such thing today in the twentieth century as a pure racial stock, let alone in such communities as we, most of us, practice in. Even in the interior today we will see representatives of ten or fifteen different racial groups. The influence of heredity and environment makes itself felt and makes a definite imprint upon the cranial configuration, and it is for those reasons that I have been very hesitant about following Dr. Simon's scheme beyond the initial investigations.

I was further curious to see how this would work out on living subjects. Last spring in my community we had a health exposition and because of the prize we offered for the best set of teeth, we had about four hundred applicants who thought they deserved \$100 for their teeth. We selected as many as we could and in Dr. Spahn's office in Newark we were able to make profile drawings and records of canine teeth, and even there, in ages from eighteen to twenty-five, with perfect occlusions and full complements of teeth, we found a great deal of variation and all except one or two were in advance of the orbital plane anywhere from one or two to six millimeters.

Dr. Paul Simon (closing).—I want to reply to the remarks of Dr. Wolfson. If I have understood him rightly, he has investigated a great number of skulls in a museum and he has found many variations as to the relation between the orbital plane and the canines. I have made the same investigations for many years and I have found the same variations—a great number of them—and I have said this in all my papers and in my books that the right conclusion is that nature doesn't give us a norm and this fact is the beginning of gnathostatics. I am sorry that Dr. Wolfson has finished on that point where it is necessary to begin.

I began with that point ten years ago and I have found that we must not only use anthropological methods, as Dr. Wolfson did, but also we must go further on and use biometrical methods. I am sorry that Dr. Wolfson does not know this science. Had he known it, he would have ordered his numbers in a curve like the curve I showed you as to the orbital law of the canines.

This science is not my science; it is the science of Dr. Quetelet, a Belgian scientist, who discovered these very important laws of the natural development of the body.

Dr. Wolfson has said that by these curves all canines were lying in front of the orbital plane. Truly, if this is right, then these curves were from Indians, and it is true that they have a different norm than the European and the American cultivated people. It is clear that the cultivated people have quite another norm than the uncultivated people because their conditions of life are quite different.

The orbital law of the canines is not a natural fact; it is a fiction; it is an average won by biometrical research and this is the only way to come to a norm.

Anyone may say that we don't need that, but that is an error, and you will understand it if you think about the thing very hard as I have done. I cannot carry to you all these difficult and complicated things in the discussion. I beg you to read my books as to this, and all questions in connection with it, I beg you to read the appendix. It is entitled "The Norm Concept in Orthodontia." I hope then you will understand the standpoint of a gnathostatist.

ETHICS IN ORTHODONTIA*

BY B. FRANK GRAY, D.D.S., SAN FRANCISCO, CALIFORNIA

Ethics, a treatise on morals. The science of moral duty; more broadly, the science of the ideal human character. The chief problems with which ethics deals concern the nature of the *summum bonum*, or highest good, the origin and validity of the sense of duty, and the character and authority of moral obligation * * * * Webster.

THERE has been a growing concern among conscientious orthodontists of late years relative to the ethical status of our specialty. One might believe that the logical steps leading to specialization in orthodontia would enhance one's sense of moral obligation. However, we have become familiar with certain practices indulged in by some members of our specialty that do poor credit to the most elementary principles of ethics. Certainly this adds nothing to the sum total of the good understanding and fraternal spirit so desirable between workers in a common field of human endeavor.

In the general practice of dentistry, in which most of us at one time were engaged, we know full well the stress laid on the code of ethics. Indeed the dentist who so far forgot his obligation to his brother practitioner, or to the public, as to do a flagrantly unethical thing was frowned upon by his fellows. In some instances the constituted dental authorities dealt with his particular problem.

The specialty of orthodontia is a child of but yesterday. It is still in its swaddling clothes. And in that fact alone do we glean the slightest excuse for the some time questionable status of its morals. I suspect the specialty is not wholly responsible for its own bad manners. Some of its earlier sponsors acquired the militant attitude and failed to inculcate in their offspring the gentler attributes in keeping with the basic principles of the code of ethics. After all we may not hope for a simpler and more clear presentation of professional obligation than that given us in the Scriptures: "Therefore all things whatsoever ye would that men should do to you do ye even so to them, for this is the law and the prophets."

Orthodontia was a pioneer specialty of dentistry. Within a few years numerous adherents were attracted to its practice. It is not difficult to understand how all sorts of differences of opinion arose regarding methods of procedure. Since the specialty revolved so fully about the idea of appliances it became quite the fashion to decry every mechanical device that differed from the pet apparatus the orthodontist himself happened to favor. Was it a so-called "removable appliance" which the patient presented? Did not every one know these appliances usually reposed in the bureau drawer, and even if worn how could effective work be accomplished with them! The orthodontist thus felt compelled, humanitarian that he was, to

*Read before the Pacific Coast Society of Orthodontists, San Francisco, Calif., February, 16, 1926.

point out the fallacy of the method. Incidentally it afforded opportunity for a little sales talk supporting his own favorite appliance which was to displace the one in use. Those of more sensitive conscience admitted their ignorance in the use of the appliance presenting and very properly suggested a method with which they felt competent to secure results. Section IV of the code of ethics states:

"He (the dentist) should avoid everything in language and conduct calculated to discredit or dishonor his profession, and should ever maintain a due respect for his brethren. The young should show especial respect to their seniors, the aged, special encouragement to their juniors."

There was the mooted question of extraction, and here I suppose the militant attitude already referred to, had its real inception. I have to confess if ever there was an excuse for disregarding all civilities of life and taking the "law into one's own hands" this was the occasion. But that battle was exceptional, its provocations justifiable, and it has been practically fought out.

The gentle little question "Plain Bands vs. Clamp Bands" has seemed to stir up as much animosity in the minds of some orthodontists as the weightier extraction problem. In certain quarters about the worst orthodontic sin that could be perpetrated was the use of a plain molar band! So grievous was this practice considered that the conscientious and self-respecting young orthodontist with a zeal worthy of a better cause could not resist acquainting the patient's parents of the criminal error of the home specialist.

Perchance a patient came under the observation of an orthodontist who noted the inside arch wires in use. This would fairly unstop the vials of his wrath.

While the foregoing suggestions apply particularly to "unorthodox" appliances, these appliances have not borne the whole brunt of this foolish furor. The most acceptable methods of the "orthodox" practitioners have not escaped disparagement. But why this fetish of appliances anyhow? The science of orthodontia is greater than any appliance—it is greater than any method—it is greater than any man!

Listen to the statements of Section 7 of the code of ethics: "When consulted by the patient of another practitioner, the dentist should guard against inquiries or hints disparaging to the family dentist, or calculated to weaken the patient's confidence in him, and if the interests of the patient will not be endangered thereby, the case should be temporarily treated and referred back to the family dentist." This clause should make clear the duty of the orthodontist in dealing with the casual tourist patient who calls for nominal examination or trivial attentions. Gratuitous advice or hints as to the future conduct of the case are not called for in such circumstances.

Possibly we do not always realize that some parents, although satisfied with the services of the home orthodontist, fairly stand on tiptoe to receive the slightest suggestion reflecting upon his ability. We have heard that even faint praise damns. He alone has labored through the difficulties inherent in the patient and whatever he may have accomplished by way of result may have been attained through great odds. Responsiveness to treatment varies exceedingly for a multitude of reasons—few of them understood. Cooperation of

patients and parents vary greatly. There are many reasons for a given rate of progress, or for failure, that do not appear on the surface. An orthodontic operation is frequently fraught with contingencies of which the public knows nothing, and I may say with regret, of which the specialist knows all too little. How then may a man, through a merely casual observation, be able intelligently to appraise the work of a fellow orthodontist?

There is another consideration of which I feel it is high time we should take stock. The most of us were, very properly doubtless, taught much of the idealism of an orthodontic procedure. An editorial in the January issue of *The Journal of the American Dental Association* gives an up-to-date boost of our great specialty. I wish the idealism there pictured were fully merited. Let us be thankful for the measure of idealism with which our work has been clothed. Most of the good we have accomplished has been because of this very idealism. But is it quite right to allow the rather one-sided impression to be gained by parents that has been customary in the past? Have you who listen to, or who may be reading this paper, ever seen a human denture which was ideally perfect, or even so good as "Secretum Apertum?" Possibly, but I doubt it. Have you ever been able permanently to maintain to a degree of one hundred per cent the relatively ideal results you have procured for many of your patients? Certainly candor must make you answer no. Some of us have observed too many unhappy ultimate results of the efforts of even our most prominent orthodontists to justify being over-sanguine in this regard.

What I am aiming to say is this: Do we not now know enough to take a more honest attitude with the parents of our patients? Let us no longer persist in claiming, or even in implying that perfect results can be secured—and maintained. Based upon our conception of what is ideal and normal, it simply cannot be done. Our clientele will respect us none the less, and we will enjoy a better conscience if we are truly honest in these matters. In Section 2 of the code of ethics we read: "—He (the dentist) should encourage no false hopes by promising success where in the nature of the case there is uncertainty." The fact that we have entered upon the practice of the specialty of orthodontia really does not exempt us from familiarizing ourselves with the code of ethics nor are we absolved from practicing its precepts.

I was convinced the other day as I casually read over the code of ethics that it contains suggestions for our guidance with which most of us are likely unfamiliar. Take the matter of consultations or examinations, about which there seems to be no well-defined rule of practice in the offices of orthodontists or of dentists. The nearest approximation to a rule is to devote a few moments to a casual observation of the patient presenting, and then to straightway quote a fee for the contemplated service; this, of course, without making any charge. The grocer and dry goods merchant are just as obliging in quoting prices. In either case if the price seems a bit high the prospective customer continues her shopping.

Just how much information can be gained in a simple cursory examination of a complicated condition of malocclusion of the teeth, (and most cases are complicated whether we appreciate it at the time or not)? Is

such superficial examination enough on which to name a fee that is fair to all parties concerned, fair to the child, to the parent, to the orthodontist? As a matter of fact is not such a procedure worth just about what is charged for it, nothing at all?

I do not need to mention the importance of a regular routine in consultations, including all data of related interest that may be contained, a full complement of radiograms, impressions and models, etc. Parents usually have a most inadequate idea of what properly constitutes an orthodontic procedure at best, and their conception of this important service is not enhanced through the inadequate methods too often followed in our offices.

A favorite habit is for the mother to come to learn the price for "straightening" the child's teeth. For a wonder the prospective patient usually accompanies her. Now the father's interest ought to be elicited to the point of his willingness to become an active party to the consultation, of course, and it is within our power to do some missionary work along this line. The father should learn at first hand what is involved in the contemplated service. With the use of a little tactful persuasion through the mother he may be glad to accompany the mother and child for the second consultation visit.

But as to the code of ethics on this point of consultation charges, the last paragraph of the final section follows: "The public has no right to tax the time and talents of the profession in examinations, prescriptions, or in any way, without proper remuneration."

When the spirit and the letter of this paragraph is put into practice by the general practitioner of dentistry, some real examinations to determine the presence or absence of dental caries, or other pathologic conditions, will come into vogue. Then the profession will consult the old textbooks and some recent ones to learn the steps that properly constitute a real examination of the teeth and their investing structures. The patient is entitled to this service, but it is right that compensation should be made for it. Examinations in general practice are nowadays almost a joke. They are not much better in orthodontia. If we are professional men let us deport ourselves as such. Until we do, the public whom we serve will look upon us as tradesmen. This slipshod practice is demoralizing alike to the practitioner and to the one seeking professional service.

And so, in the brief study I have made of this matter of ethics in orthodontia, I am more convinced than ever that we need to take stock of ourselves. I fear we too often come under the spell of influences at the same time undignified, commercial and unethical.

DISCUSSION

Dr. John R. McCoy, Los Angeles.—I have used my sober judgment in putting down a few remarks here, although I am really more deeply interested in the subject of ethics in our profession than I have allowed myself to put down in black and white.

We are deeply indebted to Dr. Gray for having the courage of his convictions in placing before us the unbiased truth as regards the surprising status of our profession in professional ethics.

It should be unnecessary for a great and dignified profession to have a long and exacting code of ethics. One would expect a highly educated group of men naturally to adhere to the principles of the golden rule but unfortunately, as you all know, such is not the case.

Very, very early in my orthodontic training, I was deeply impressed by the militant attitude of certain men, highly respected by our profession at that time, who were inclined to speak of their professional brothers in a most sarcastic and uncomplimentary way whenever they could not agree with them as to this or that way to make a band, twist a wire, etc. A young student is likely to fall for this buncombe and most of the time he does, and so makes no effort to become acquainted with those before mentioned professional brothers whom he has been taught are outside the pale and follows the example of those who have taught him to speak ill of others and so continues this practice without further investigation. I feel that this is the seat of most of the trouble.

In Los Angeles, before the majority of us began to gather together and put our feet under the same table every three months, I am sure there was many a hard word said about our misunderstood brother orthodontists. But when you meet a fellow and find him just a plain human being like yourself, your attitude is entirely changed. The little minority who will not mix, will of course be lead around by their noses and continue to knock. However, our concern is to see that we, in our conduct, are beyond reproach.

It is merely necessary for any of us to consider the past controversies to blush with shame because of the littleness of it all. How aptly has Dr. Gray said, "But why this fetish of appliances anyhow? The science of orthodontia is greater than any appliances,—it is greater than any method,—it is greater than any man!"

Dr. Gray's discussion of the orthodontic examination problem is quite apropos and should be seriously considered. The truth is that many are cheating themselves with the present vogue of just giving the patient the once over, naming a fee and calling it an examination. The desirable type of parent would prefer a real examination and will never refuse to pay providing they can realize that they are really receiving something for their money.

There is no doubt in my mind that Dr. Gray has stated considerable truth when he says, "We need take stock of ourselves and the sooner we do it the better."

Dr. A. H. Suggett, San Francisco.—I am very glad indeed that Dr. Gray has presented this subject to us for we are often distressed by the bad manners of some of our professional brothers. Frank Gray is just the one to discuss this subject, for he is gentle and kind. Abusive words do not belong in his vocabulary. He seems to have burned all the bitterness out of his soul, if he ever had any in it. I am glad he quotes the golden rule on which our ethics are founded. I wonder if instead of talking about our code of ethics, should we not express ourselves in terms of good manners, courtesy, and self-respect. No one can stand to be classed as ill-mannered and discourteous. The orthodontist who violates the professional ethics is a crude ill-mannered man, and is devoid of all courtesy and modesty. The English would call him a bounder, and consider him a person to be snubbed. They would look right through him, and not see him.

So when we come right down to the question of ethics, it is really the problem of getting along with other people. It is a study of human behavior, causes and effects. Human behavior is a science, and should be treated scientifically. Human behavior is effected by causes and condition as positively as the effect found in physics. If water comes in contact with heat in the depths of the earth and there is no vent for the steam, there will be an explosion. There is a cause, and there is the effect. It is not a moral problem, it is a scientific problem. After great wars or social upheavals, violence and lawlessness follow. There is an economic problem, and it must be treated scientifically. If we examine our professional bad manners we may find the cause, and treating it scientifically remove the cause and cure the disease.

As we get to know each other better, we judge less for we understand. Dr. McCoy made the point that, in coming together and knowing each other, we find less to criticize and more to love.

I often think of a remark President Wilson quoted about Charles Lamb, saying that there was a certain man whom he hated very badly, and his friend said, "I didn't know you knew him." He said, "I don't know him; I don't hate anybody that I know." I think, perhaps, that is true of people in general. If we get together and understand each other we generally remove all friction.

In the beginning of this profession a great many dentists who had been practicing, with indifferent success succeeded in orthodontics beyond their wildest expectations. They were afraid that something might happen to all this good fortune. They thought that any new orthodontist who came along would steal their patients. It never occurred to them that there was a new field with new problems to be solved. However, that was their fear. After they came together in orthodontic societies and got to know each other and set aside the bunk bluff and instead of telling of our successes, commenced to do what all orthodontists are doing now, that is, not talking about successes so much, but about failures and fessing up, that removes the friction. So, I think it is just an understanding of human behavior playing square, and we will find that those suspicions will gradually disappear.

Now, in regard to the point that Dr. Gray spoke about of diagnosis, I am pleased to say that there seems to be a general trend for better diagnosis. Look at the work that Dr. Ketcham has done here showing what wonderful things are hidden and shown up by the x-ray. There is no longer any more privacy up there in that solid ivory than the gold fish has in a glass bowl. He has given us all an eye-opener. There is research work being done all along the line and all of us are beginning to feel that our diagnoses, up to date, have not been as complete as they should have been. With some of the new things we are going to consider at this meeting, with the work that Dr. Ketcham is doing, and with the pictures and with models, I think that within the next few years you are going to find that members of this Society, when they look over a case and make out a diagnosis, will not be ashamed to submit it to any scientific medical man, or any college professor, for there will be something there that will tell him what we are looking at, what condition that mouth is in. We are not going to fall into some of the blunders that Dr. Ketcham pointed out, that we did in the past, because of the lack of proper x-rays and examinations.

I think we should consider our ethics more as a scientific problem and not so much from the viewpoint of a moral problem. Morals change. For instance, when I was over in India it was perfectly moral and lawful for a man to have a harem—a dozen wives. Here you don't do that openly. Twenty years ago, in our country, a divorced woman was almost an outcast. We have got that bunk out of us. Even five years ago if you stepped out here in the hall and had seen a girl sitting there showing her knees it would have been considered immoral. They don't dress any other way now. So, you see, things are changing and we make a great mistake in trying to judge a problem by morals. Morals change with the times and country. They are like religion, largely a matter of geography.

Dr. Gray has hinted at one of the causes. Orthodontics is new, it is uncivilized, it is a barbarian. It has not developed manners, etiquette, and culture. We still carry guns for the other fellow, we are not welcome over in the other fellow's reservation. We are not satisfied with scalps, we carry off their women and children (patients). We make faces at each other. A big chief of one tribe sent a card to a big buck of another tribe saying "come to our powwow you saphead and learn something." By and by all old chiefs and big bucks with bad manners will drink too much fire water and eat too much bear meat and kick the bucket, then everything will be much better.

Dr. Carter.—This matter of ethics is a very important one and we can well afford to spend considerable time in the discussion of it.

Now, I think we need some new terms to apply to some of these unethical men and I am going to ask Dr. James McCoy if he can help us out?

Dr. James D. McCoy, Los Angeles.—In discussing this very excellent paper which Dr. Gray has given us, I want to say that I believe that professional ethics is a simple thing. It means the practice of ordinary common courtesy. It simply means, as Dr. Gray

has defined it, the application of the golden rule. In spite of the fact that we may have differences of opinion, that we may use different methods, there is no reason why, if a patient of one man passes into the hands of another the confidence of the patient in the first man should be shaken or destroyed. It is an easy thing for a man of intelligence, for a man of even an ordinary amount of gray matter to explain to the patient that he is able to get better results through utilizing certain routine methods he is in the habit of using and for that reason it is his desire to make a change in the appliances. If he will only take the time to make that explanation he can accomplish it without injuring the other man in the slightest degree.

In spite of the fact that such embarrassments can easily be avoided, appliances are the most frequent source of breaches of etiquette. At least this is so down in the country where we live. Down there we have a group of men whom we are accustomed to refer to as "Marionettes." They play in a great Punch and Judy show which goes on there constantly and they mouth certain "manufactured axioms," if you want to call them that, which have been taught to them just as the parrots have been taught, through centuries, to say "Polly wants a cracker."

They make a great plea for certain patented appliances and the "superiority" they assume because of these appliances is laughable.

I think it is a great mistake in discussing prospective cases with our patients, to make extravagant promises. If we will limit our promises, or claims, solely to "endeavoring to do our very best for the patient" we will not only be safe but truthful. All of us, that is those who have had sufficient experience, realize that there are but a limited number of cases where you can get 100 per cent results if judged by the standard of ideal occlusion. There are others where this is not possible but where a lesser degree of perfection is of vast benefit to the patient. There are some cases where even a 50 per cent result when judged by the ideal may be considered as being successful treatment, because of the various problems and limitations which you have to meet in such cases. Such possibilities and some of the conditions bearing upon them should be explained to patients in justice to all concerned. Where we make an examination we should do it by appointment with ample time reserved for it. If necessary, we could make study models and radiograms and go into the history of the case and try to put that patient in possession of information which will be of real benefit.

Dr. Carter.—I believe that Dr. Millberry could give us some very interesting remarks on ethics.

Dr. Millberry, San Francisco.—It always interests me to attend the meetings of the Pacific Coast Society of Orthodontists because there is always such a volume of dependable information available and some rather interesting sidelights on the practice of orthodontia.

I believe this question which has been presented by Dr. B. Frank Gray, is one we ought to take into consideration in our school work in the training of the younger men. It seems to me that most of the difficulties which arise in carrying out the ideals of ethical practice among the young men are due to a misunderstanding of the true meaning of ethics. Almost every dentist conceives unethical practice as advertising. As long as he does not advertise in the papers he thinks he is a perfectly ethical practitioner. I think that is because the dental profession has led him to believe that advertising is the basis of all unethical conduct.

From my own point of view ethics is the science of right conduct. It differs from morals, because a man can be immoral in his private life and highly ethical in his practice and, therefore, there is apparently no correlation between the two in a general way. A man may be very immoral in his business life and highly ethical in his home life or his relations with other men in a general way and be known as a fine man or a reprobate by different groups. So, it seems, that ethics is comparable more with honor and morals than with honesty. A man may be honest, in so far as his relations with other people are concerned, and yet he may not have a high degree of honor; he doesn't stand out in the community as a distinctly honorable man in all his public transactions.

There is another element in this problem that interests me and that is *Truth*. My conception of ethics in practice has been *Truth*, and I have always felt that every man who

practices dentistry or orthodontia ethically should tell the truth. I think the man who deceives his patient or deceives his collaborator or his colleague, is not an ethical man. If he is truthful and tactful, at the same time, he can do what Dr. McCoy has suggested—he can convey the proper message to his client and at the same time show proper respect to his colleagues.

There is another phase that presents itself to me, which Dr. Gray did not touch on, and that is the two-sided phase of the question. One is the relation of the orthodontist with his patients and his ethical conduct toward them. The other is the relation with his colleagues in practice and that involves, not infrequently the transfer of patients from one city to another, or from one state to another, and the apparent necessity for differing in methods of treatment and in the handling of the problems.

Regarding the examination fee, and its relation to ethics, it is merely a business problem and not an ethical problem. I think every man ought to charge for the service he renders and because one man does not charge an examination fee and another does, the former is not unethical. I think it is good business to charge for an examination in dentistry, as well as for anything else. If the consensus of opinion is that you should charge a fee then let it be known as a business relation rather than an ethical relation. I feel that the message Dr. Gray has brought to us today is very important. I can say candidly, as I love and like him, that we need not read his story, but we only need to look at his life to appreciate the fact that he believes in ethics.

Dr. Carter.—We would like to hear from Dr. Ketcham on this matter.

Dr. A. H. Ketcham, Denver, Colo.—As has just been said we all know that Dr. Gray is a gentleman. He has been refined like pure gold.

The question which Dr. Gray has brought up is timely and he has handled it in a splendid manner.

I agree with Dr. Millberry that the question of charging for consultation is purely a business question. All of us have had mothers who bring their children in to us and say they simply wanted to know how much treatment would cost. I explain to them that I never make an estimate without a study of the case and making a diagnosis; that if I should give a snap judgment of cost of treating this child's malocclusion I would have to protect myself by naming the maximum fee and that I would, perhaps, be doing an injustice to the patient. Or, if I made the fee too low I would be doing myself an injustice. I state that I must go into the case thoroughly from all angles and must have models and radiograms to study along with the face. I further explain that we are contemplating something which will take several years to consummate and if the treatment is to really benefit the child we must give it careful and thorough consideration and for that I make a charge. Any fair-minded person will see the logic of this explanation, and the shoppers, we don't care for anyway.

Now, there is the question of abuse that we must deal with. There can be no question but that abuse gets under one's hide if it is continued long enough. We all know that dripping water will wear away a stone. I believe this abuse can be corrected in a dignified way, and as Dr. Suggett has suggested, the best remedy is science. Analyze it. Is it scientific? Are their methods scientific? If they are not you have the answer and you need not fear. Go right along trying to learn the truth of what is really scientific in the present-day methods of treating orthodontic cases, and you will win out.

I want to say that I am grateful to Dr. Gray for bringing this subject up and for handling it the way he has.

Dr. B. Frank Gray (closing).—I do not think it is worth while for me to spend much time in closing because the discussion has brought out some points, as I hoped it would, and that was largely the object of the paper.

I think Dr. John McCoy made a very important suggestion—that our relations, one with the other, have been bettered through our coming together, and as he put it, "getting our feet under the same table," meaning, of course, our orthodontic meetings and the

discussion of our common topics of interest. That has helped to better our understanding and all of these efforts along this line are with a view of improving the status of ethics in orthodontia.

Dr. Suggett made some good points about how the abuse of this subject might be classed or termed.

I believe, as among the English people, it is quite outside the pale of common decency to indulge in some of the petty little things that we have brought to our attention in this country.

I have heard Dr. Suggett make use before of the quotation from Charles Lamb—"I don't hate anybody that I know." I think that is a mighty good thing and I have profited myself through hearing Dr. Suggett quote it on two or three different occasions. As we think it over there is a whole lot of truth in it. We give quick expression about certain men, so often, that we do not know. If we knew them we would not speak as we do about them.

Not acknowledging failure has, perhaps, been one of our outstanding faults. We have been going along for some twenty years, in the practice of orthodontia, not being willing to acknowledge failure, as though failure was quite outside the pale of our profession or experience. It seems like there is plenty of opportunity to acknowledge failure. I do not know of anybody who could really and honestly claim to be free from some failures in the work. I think it will help us, if we acknowledge those things, and then get down and try to find out why we failed.

Dr. James McCoy always has something to say that is apropos to the subject and I enjoyed his comments.

Dr. Millberry spoke along the line of some of these troubles having their inception with the younger men and that their ideas of ethics centered around the notion that the whole thing rested upon the subject of nonadvertising. I think that is very much to the point. It does seem, as I think of the basic thought about ethics, to center right there. So, it is a very good thing for us to counteract that inadequate idea of the matter.

As to the matter of charges, etc., of course, there are always opportunities for some difference of opinion and possibly there are cases that may call for modification of some of the rules of our code of ethics. The ethics of the profession are pretty well covered by the code however, and I think we can still accept it as a guide to our professional conduct. Of course, we find, in some of those cases where we feel that we have given sufficient attention to a case to justify a consultation fee, the interested parent expresses surprise that we make a charge for having done nothing, as they may style it, yet back in the code of ethics we have the warrant for being compensated for the time that is spent, as we believe, for the good of the patient. The point is, that I don't like the idea of having to be put on a basis with the tradesmen, that is, that we are bidding for a case and if we don't happen to get our bid low enough they will go to some other orthodontist. That isn't dignified. A man has a right to set his own fee, but this thing of shopping about is very distasteful.

Dr. Ketcham brought out a very practical point, a point, I think we all need to emphasize and keep in mind, and there is a lot back of it that we can utilize; that is, if a patient resents our consultation or examination fee, we can tell them, as he stated, that in order to give them adequate information and in order to give them a notion as to the cost of the service involved we can only do so, in justice to them, by having a thorough examination and going into all the phases of the case, which means an expenditure of time and study, and that no fair-minded parent would expect to receive that service without paying for it.

Mr. President, I want to thank those who discussed the paper.

HEREDITARY INFLUENCES IN ORTHODONTIA*

BY H. L. MOREHOUSE, D.D.S., SPOKANE, WASH.

I WANT to make a comment at the beginning of my paper which might possibly, under ordinary circumstances, be made at the end. In the first place, the subject is a misnomer, as I have told both the gentlemen who were to discuss it. Secondly, because I think the object is possibly so obscure that some of you might miss what I was in hopes of bringing out.

There are two points that I want you to bear in mind, as I read my paper. First, the desire to see whether, through direct heredity, we were doing anything for posterity in our work of orthodontia in the development of the jaws. Secondly, if, through direct heredity, we may not be doing something in handing down, from one generation to another, better developed jaws through orthodontic treatment. This might not, in a more general way, be credited to orthodontia, but to a better constitution brought about by better masticatory apparatus from the development of the jaws by orthodontic work.

That, as I said, is sort of a prelude to the thought in mind which I would like to have you carry with you while I am reading the paper.

In selecting this subject I did so with the best intentions, but the farther I went into the subject the less I was sure of those intentions.

My first object was to bring to your attention, in a short résumé form, some of the findings of the outstanding scientists and authorities on the subject. By so doing it might be possible to reach some conclusions regarding the proper course to pursue in treatment of certain types of cases, requiring a great amount of anterior development, especially cases fifteen years of age and older.

But, after many weeks of study I find myself in much the same position as the negro, who indulged in sometimes sermonizing on some large word he had heard some one else use and you will probably be like a member of his congregation who questioned him later regarding the meaning of his text. This time he had selected the word "Procrastination" as the subject of his discourse. After a lengthy dissertation before his congregation, on Sunday morning, a member of his flock came up to him and said, "That was a wonderful sermon, Rev. Jones, a wonderful sermon, but what I'd like to ask you, is, what is this Procrastination?" Rev. Jones looked at Sam for a moment, then said, "Procrastination is—procrastin—is—why, Sam, I is astonished at your ignorance after listening to my sermon."

The question I have asked myself many times and which prompted me to delve into the subject was: "In our work of orthodontia what are we doing for posterity?" Stating it more clearly, "Are we, in our sometimes lengthy

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and laborious treatments going to improve the shapes and forms of mouths and features of the future generations?"

In order to answer if possible these questions for myself I started to read some of the authorities, and what I found I have tried to condense in as understandable a form as possible. Of necessity most of it will be quotations from such authorities as Archibald Reid and Edwin G. Conklin, Professor of Biology at Princeton University. The latter's book on "Heredity and Environment" in the development of man is worth one's time to read.

Quoting from "The Laws of Heredity" by G. Archibald Reid:

"Popularly, and even by scientific men, the human race is supposed to be undergoing progression in all sorts of directions. Others suppose that cessation of selection is resulting in general retrogression. But clearly, as in other species, the great majority of human physical characters are merely stationary. They are selected but only to an extent which maintains an efficiency previously established. They fit the race well to the environment, and only marked defect usually results in a failure to rear offspring. Judging from ancient remains and from a comparison with modern savages, civilized man differs little, if at all from his remote ancestors in hands, feet, blood, bones, heart, lungs, and the like. Doubtless, owing to accidents of survivals, to sexual selections, or to migration which brings different sets of selecting agencies into play, all races have undergone some structural changes; but these are comparatively unimportant. In obvious physical features, the features by which biologists are accustomed to measure physical change, humanity as a whole has undergone little innate alteration during the few thousands of years of civilization. We are said to be more bulky than our ancestors of six or seven centuries ago, but there is no evidence that during the interval big individuals have been especially selected for survival. Probably, therefore, the increase in size is due merely to environmental changes, such as improved nutrition and treatment of the young, which permits better individual development. An analogous case is that the modern girl of the higher classes is taller on the average than her grandmother, and the modern field laborer than the factory hand. Some modern savages are taller on the average than the members of any civilized race, and some skeletons of the Stone Age are those of large men with well-developed crania.

"Of retrogression, also, there is little positive evidence. Thus, when suitably trained, civilized men appear to be, on the whole, just as keen of sight and hearing and as capable of enduring fatigue as savages. The Boers and Australian whites are cases in point. It is only when we compare man to the nearest lower animals that we seem to obtain positive evidence. Some of his senses, his hearing and sense of smell, for example, appear weaker. His jaws and teeth certainly, and probably his digestive apparatus, have undergone retrogression. He is less able to masticate and assimilate the raw coarse food on which his ancestors subsisted. But even here, it is probable that much is attributable to the direct action of the environment on the developing structures. The senses of hearing and touch and possibly of smell, become very acute in the blind, and civilized children are supplied with such soft food that their jaws are not stimulated to the utmost possible develop-

ment. Their teeth, which owe nothing to the stimulus of use, and therefore, attain their full size, are crowded irregularly together in the small jaws, and while retaining fragments of fermentable food in their interstices, are not cleansed by the tough fibrous substances which form a prominent part of the diet of savages. They are therefore particularly exposed to decay. African negroes have magnificent teeth; their relatives in America suffer much from caries; yet only a few generations separate the American black from a savage ancestry."

It is not necessary for me before this body of men to take the time to describe biologically the germ cell or its actions, but I will without further waste of time take up the part of this question which I feel deals chiefly with that which our work of orthodontia will effect or not effect in the future generations.

"Galton was one of the first to bring order out of chaos by dealing with traits or characters singly instead of treating all together.

"We have been taught that in general like produces like and regardless of many exceptions, children are in their main characteristics like their parents.

"Whenever the differential cause of a character is a germinal one the character is, by definition, inherited; on the other hand whenever the differential cause is environmental the character is not inherited."

This explanation must be continually borne in mind throughout a discussion of the subject and a classification made of what characters are to be defined as environmental.

Conklin states in another place, that: "Unusually great or small statures run in certain families and in the same way the color of the eyes are in general like those of one or more of the parents or grandparents, also that certain features such as the shape and size of the eyes, nose, mouth and chin are generally characteristic of certain families."

We all know there are many exceptions to the statement I just quoted and authorities classify these variations under two heads, those which are caused by a different germinal constitution and are therefore inherited and those due to environmental differences which are not inherited.

If then we classify the many irregularities and facial deformities that are brought about by the lack of development of the jaws, by injury, or the changes produced by orthodontic treatment as "Acquired Characters," then we must admit that we are not doing anything of particular value for the future generations and we shall think only of the comfort and welfare of the individual patient, making that the deciding point as to how that particular case should be treated. By this I mean whether by judicious extraction the result gained would be as beneficial for the future of the patient as though the ideal of what has always been termed normal occlusion was followed to the letter.

We must admit that we are not doing anything of particular value for the future generations except in so far as our results help to benefit the

health and improve the constitution of our patients and in so doing make it possible to produce healthier offspring, providing, of course, they unite with an equally strong constitution.

If on the contrary these conditions just mentioned cannot be classified as "Acquired Characters," then they are in the class of inherited characteristics and we should be more particular than ever to make our finished cases just as near the ideal as is possible regardless of the time involved or the amount of tooth movement necessary.

Professor Conklin sums up the question of the "Influence of Environment" on the human race as follows: "If acquired characters were really inherited we should expect to find many positive evidences of this instead of sporadic and doubtful cases."

In closing I want to quote another authority who says, "One of the most difficult things in the world is to recognize a great truth, to feel its significance and yet not be carried away by it. Great scientific errors are frequently due, not so much to faulty observations, as to sweeping conclusions."

DISCUSSION

Dr. Thomas R. Sweet, Oakland, Calif.—Dr. Morehouse has given a paper with many points that would require a lengthy discussion and then they would probably never be answered. Many of the questions he has asked in the paper I have also asked of biologists and none of them seem to be able to answer them.

The main objection to his paper was that he didn't get the edition out early enough. I received a copy of his paper only one hour ago and I had barely time to scan it over so you will have to excuse me for not presenting a better discussion. I hope Dr. Bell has had a better opportunity to prepare his discussion.

Dr. Morehouse has brought up a very old and much debated question. That: Are we in our lengthy and laborious treatments going to improve the shapes and forms of mouths and features of the future generations?

I have asked this question of scientific men many times but have as yet to receive a more definite answer than such as this, "The Jewish race have practiced circumcision and certain types of dogs have had their tails manicured for generations without any signs of the parts being lost."

At our last meeting it was asked of one of our essayists whether or not, if there is such a thing as an hereditary malocclusion and the irregularity was corrected, could we have any assurance that it would stay in place, the cause not being removed. He had no information relative to this and did not believe that anyone did. It seems only reasonable to believe that if the cause was not removed the correction would not be permanent. This might be a good excuse for us to use on our failures, till then it is an hereditary case.

Directly I do not believe that we are handing anything down to the future generations by correcting malocclusion. Environment, diet, etc., being the same, I do not believe that because we have corrected the teeth of an individual; their offspring would have a better chance for normal jaws and teeth.

I remember, a couple of years ago, that I had as a patient, the daughter of a physician and as I was making the appliances the father was standing at the end of the table. The subject of heredity came up. We discussed it back and forth and finally the little girl ten years old looked up at me and said, "Dr., if you correct my teeth are my children going to have straight teeth?"

Indirectly we probably do hand to the future generations a better chance of becoming normal not only from a standpoint of mouth and jaws, but from a general physical de-

velopment because of our corrections. If in our corrective work we improve the function of the teeth and jaws we necessarily improve function and physical perfection of the entire body and this in turn may enhance the chances of the offspring.

Dr. Morehouse suggests the proper mating of the individual to insure best results and with this I heartily agree. I think we all believe in eugenics and I can see no good reason why we should not advocate dental eugenics.

From observation I am led to believe when parents having like malocclusions produce offspring a very high percentage of their offspring will inherit the same type of malocclusion as the parents have.

That is, if you have two people with closed bites and they marry, I have reason to believe from observation, that a large percentage of their offspring will also have closed bites.

I have enjoyed Dr. Morehouse's paper very much. I am sorry that I did not have more time to prepare my discussion.

Dr. Carter.—Speaking of hereditary influences, there seems to be a certain thing that is passed down from orthodontist to orthodontist and that is the excuse for not having received the paper.

Dr. Bell, will you continue the discussion on this subject?

Dr. W. J. Bell, *Los Angeles*.—I received this paper two or three days ago so I guess that Dr. Sweet got the "mud." Unfortunately, however, all my friends came to see me every day after that and they corralled me and I didn't have the opportunity to go into the details of this discussion as much as I would have liked. It is a very deep subject, and it requires a lot of study. Perhaps there are few subjects that exist today on which the orthodontists are so divided on as to what is inherited and what is acquired. If you would take a vote here today on that subject you would be surprised how they would line up on each side.

The paper presented by Dr. Morehouse brings out some very good points especially the difference between inherited and acquired malocclusion, a subject on which the orthodontic profession is greatly divided.

It is not strange that they differ in their opinions, for as yet we are in the dark as to scientific truths. In reaching out for these obscure truths men are bound to be confused until a fixed law of nature pertaining thereto has been discovered. All knowledge comes from that which we read, hear, and see, or from our own efforts and even then the interpretation of each will differ. The trend of modern times is to discredit the inherited theory. The law Dr. Morehouse quotes that "like produces like," I believe still holds good. If so, what of nature's effort to reproduce the massive jaws and teeth of the father and at the same time the smaller ones of the mother. And on the other hand, what of the other organs of the body which are reproduced and developed to such perfection and only the teeth and jaws are defective. This would clearly indicate the interference with the bony structure only.

All animals intended for the food of man are bred with the greatest of care, eliminating the defective and breeding only the finest species until today they are very near perfection. If this is not a fact the "Bureau of Standards" at Washington is badly misled and wasting a lot of time.

Men and women are ignoring these laws. The mating seems to be one of sentiment rather than one of careful selection as to present and previous physical and mental conditions.

Some authors believe that the thyroid and pituitary glands when not functioning properly have a marked effect on the child. Others believe that rickets can be hereditary. In fact it might be said that any constitutional fault which tends to weaken the forces of nature is sure to leave its mark on future generations.

I shall not attempt to classify the inherited from the acquired. Personally I am a strong believer in the inherited causes. Believing that deformed jaws are on the increase

and coming back to the original question, What are we doing for posterity? My answer would be, nothing. Particularly is this true of inherited cases. For the reason that we are only dealing with the remedy and not the cause. So long as the cause remains I fail to see where the remedy is going to benefit the future race. As to the acquired cases these might be divided and subdivided into classes which would be beneficial to the future race, while others would not be benefited.

Dr. Allen E. Scott, San Francisco.—To begin with I want to thank Dr. Morehouse for his paper. There is a lot for thought and study in it. The question of heredity and environment probably will be a question discussed as long as any of us are here to discuss it.

No doubt you are all acquainted with Mendel's work. The auspices under which Mendel's work was done is interesting because his work was done along about the year 1870 and it was many years after that before the true value of his work was discovered. In short, his work was this: He took some peas, eighteen inches tall, and crossed those with peas about six feet tall. What he obtained was interesting. He obtained, of course, some seeds from the cross and he planted those seeds and he received from those seeds some very tall ones and some very short ones. Then if he planted the seeds from the dwarf vines he found out invariably he got small vines, but the seeds from the tall vines would produce some tall and some shorts, and so on, and the ratio of tall to the shorts was about three to one. In other words, the short ones bred true and the tall ones did not breed true.

Now, we see some very very interesting things in nature. For instance, very often a couple, both having dark hair, will have a child who has red hair and a great many times this discrepancy is somewhat questionable. At the same time it is perfectly possible and it simply means that back through the ages some place there was in the family a person having red hair.

We must remember, in discussing this, and thinking about it, that we are not merely the product of our mothers and fathers, but we are the product of everything that has gone before us through all the generations. Also, in the case of a chicken, nothing can come out of an egg but what was already in the egg.

For instance, Mozart, the musician, was the only man of any musical ability in the whole family. He had no ancestors who were musicians, but he was subjected to an environment of music. The blacksmith develops a strong arm by its use and his children will not have any stronger arms, or more developed muscles, than those children of any other man. The blacksmith's arm was developed by use and that is an environmental arm.

You have heard the story about the giraffe. He has a long neck and browses on trees. Does he browse on trees because he has a long neck or has he a long neck because he browses on trees? That is an old story that has been in biology for years.

The subject of environment is as interesting as heredity. You can take certain flowers and change their elevation, that is bring them down from high mountains and put them in an elevation near the sea level and they will change their color. That is not heredity. That is environment. You can take white mice from the north and bring them to a hot climate and they will change their color. If you think about it for a moment, most all dark races live in warm climates.

My friend, Dr. Sweet, forgot to mention that you can take rats and cut their tails off for generation after generation and the baby rats will come along with tails just the same. That is purely an environment characteristic and will not be passed on to progeny.

I would rather discuss the discussion than to discuss the paper because the discussion is more interesting than the paper.

The idea seems to prevail that malocclusion is inherited. I don't believe it is. I cannot see how it can be because for a thing to be inherited it must be within the germ cells and we can talk malocclusion from now until Gabriel toots his horn and you will still have an environment or an acquired characteristic which will not be inherited. I discussed this subject one time with Professor Kofoed of the University of California and

I went at it this way: I said biologists all admit that certain changes will take place under environment. I asked "How do you account for this?" He said, "We cannot account for it, but we admit that it takes place." For instance, I understand that some of the fish in the caves, particularly those of Kentucky where little or no light ever comes in have almost lost the use of their eyes. That is because they have not used their eyes and having no use for them nature has made an effort to eliminate them. Nature will do the same thing, evidently, with certain other parts of our body. So, I do not see, if we correct malocclusion, how that will be passed on to posterity, except in a most indirect way, that is, by getting the children to use their teeth and chew their food and take care of the deciduous teeth, and all that sort of thing.

I cannot see how a man can have a definite opinion on this subject until we learn the cause of malocclusion and if a man discovers the cause of malocclusion he will be a wonderful man in orthodontia because I am firmly convinced that we know little or nothing about the cause of malocclusion at the present time. If we don't know the cause of malocclusion how could any man say it is hereditary, environmental, or anything else?

Dr. P. T. Meaney, Portland, Oregon.—Getting down to facts why can't we be told of the cases they think are inherited so that we can really think of them in terms of certain types of cases rather than generalities?

Dr. Carter.—We intended to surprise you this afternoon by having Luther Burbank here to discuss this paper and give us some of his ideas on hereditary influences. Unfortunately, Mr. Burbank, is not going around, or is not discussing papers or visiting societies or clubs, or taking part personally in such activities, but his reply to us showed considerable interest. He was very courteous and explained very nicely why he couldn't be here. He sent some few remarks, giving his idea on hereditary influences, and Dr. Gray will give us the substance of those remarks.

Dr. B. Frank Gray.—With Mr. Burbank's reply to an invitation to discuss Dr. Morehouse's paper he sent an old reprint, published in 1912, and it had some bearing on heredity as applied to plants and so on. He did not touch intimately upon Dr. Morehouse's subject. He did bring out, and made reference to favoring plants with proper environment, as to soil and culture. He stressed that very very much and in that particular, I am sure he would have said, had he been here, that the same sort of influence would apply to the human mechanism. He was very courteous in his reply and gave as his excuse for not doing something more, that he was tremendously overwhelmed with correspondence just now on a certain subject with which most of us are familiar. He said that he had about 3,000 unanswered letters and that he was doing his best to get out from under that burden.

I am personally glad that Dr. Morehouse brought this subject up because it does bring out a discussion of something that is vital in orthodontia. It is true that we know too little about it and it is necessary to get our opinions aired once in a while. My own are not very definite.

I recall recently reading an article by Sir Arthur Keith, professor in one of the largest schools in England, which appeared in a recent issue of *Living Age*, quoted from the English Medical Journal, *The Lancet*. He is an anthropologist of great note and has made examinations of 1,000 ancient skulls, and an equal number of what he terms modern skulls. He had noted one remarkable incident in comparison, that is, in the ancient skull he found an end to end occlusion, I think, almost invariably in the incisor region. In the modern skulls he found an overbite, to a greater or lesser extent.

I think, as I believe Dr. Morehouse concluded, that the benefit to posterity is to be through improved function, therefore, through improved health. It seems to me like that should have its impression in time if the benefit were thorough enough. If we could greatly improve the teeth of great numbers of children so that their health would be enhanced and improved, as they become parents it seems the offspring would have far better opportunities to develop normal dentures than otherwise.

Dr. Carter.—Dr. Meaney has requested us to get down to cases. If there is anybody here who wants to take up this discussion and answer Dr. Meaney's question I would be glad to give them the rest of the time.

Dr. John E. Taylor, Hollywood, Calif.—I just want to say that Kammerer of Berlin, Germany, has recently published a book entitled *The Inheritance of Acquired Characteristics*, wherein he advances the theory that acquired characteristics can be and are inherited.

He plainly demonstrates and proves his theory. To my mind it is very certain that this phenomena does occur in nature. He calls attention to the very things that have been mentioned here today—the cutting off of the dog's tail, the dehorning of cattle and so on, but he points out the fact that when the tail of a dog is cut off, that it is then a *lost* characteristic and lost characteristics are not, of course, inherited. When a certain characteristic is acquired it can be transmitted from parent to offspring but it is quite a different thing to expect a lost characteristic to be passed on to future generations. There is a great deal of difference.

Dr. A. H. Suggett.—I am frank to admit that I do not know much about what happens, as to heredity, in the case of dogs and cows, and things of that kind, but being a student of sociology I notice that if a Methodist marries a Methodist that their children are Methodists; I notice that if a Methodist marries a Unitarian that half the children are Unitarians and half of them are Methodists. Some very peculiar things happen. If a Catholic marries a Protestant the children are all Catholics. However, there is one problem that sociologists have been studying for many years, that is, why when a Scot marries a Jew all the children are bankers?

Dr. A. A. Solley.—I would like to ask Dr. Scott a question. Did Mendel, in his deductions, make any reference as to the percentage of the reversion to type? If he did I would like to hear it.

Dr. Allen E. Scott.—I am not sufficiently acquainted with Mendel's work to go into the division of types and dominant characteristics, and so on, except to say that where one characteristic is predominantly present over another characteristic that the predominant characteristic is more apt to obtain.

Dr. Charles C. Mann, Seattle, Wash.—I believe that there is only one solution for transmitting perfect dentures down to posterity. If you can eliminate sentiment and emotion, from the marriage relations, colonize your people, as you would colonize plants or animals, or anything else that you want to perfect, isolate your colony and produce your progeny, you can have some perfect dentures. That is the only way you will ever have them.

Dr. F. W. Epley, San Francisco.—I once taught this subject and I used to be fairly familiar with the literature.

In regard to Mendel's work I have this to say: He crossed white and red peas together, or planted them together and allowed them to cross. He checked the seeds and found that one-fourth of the peas if planted would breed indefinitely, that is, always produce red peas and that another fourth, when planted would produce white peas indefinitely. He found that the other half, if planted would again break up in the same way. They were mongrels. If this half that I am talking about were planted, one-fourth of the offspring would produce straight red peas, generation after generation and the other fourth would produce white peas generation after generation. The other half would be hybrid again.

That is the way Mendel's work came out. If you try to read a book on the Mendelian theory you will find it a serious proposition. It is a difficult subject.

I would like to say that I believe that Dr. Morehouse about summed up the situation correctly. There is no doubt that robustness and vigor are passed on to succeeding generations; also that dwarfish and poor constitutions are passed along. You can breed hens and poorly feed them and keep them in poor environments, and if any of you gentlemen have had the hen fever, you know that they will practically run out. They become poorer

and poorer. On the other hand, others that are kept in a fine environment will produce good offsprings.

So, I believe Dr. Morehouse is right in saying that where we conduce a child's good health by putting his teeth in correct occlusion that we make him a better animal and better able to beget a good offspring.

It occurred to me that there is a moral side to that, or a psychologic side, if you want to use that abused term. I believe it is a settled fact that "men can because they think they can." You let a boy spring from a family where it is in the air, in the talk, in the philosophy of that family, that he is able to do things and he goes out with strong confidence that he is able to do things. I know of a case reported to me not long ago, of a young man who had badly protruding front teeth, trying to be a salesman. Some orthodontist corrected that condition. His sales of merchandise jumped hundreds of dollars immediately. It must be that that had something to do with his life and with his becoming a more successful man. The environment in his home became that of a successful man and I believe his children will make a better success in life even though that deformity may not be visited upon them.

Now I want to say just a word about the inheritance of malocclusion. Every time a case comes to me I inquire about the patient's ancestry. If the mother, who often brings the child in, isn't troubled in this same way, I ask about the father. Usually one or the other is.

Malocclusions, due to missing teeth, run in families. There are families, as some of you know, where all the sisters, cousins or aunts, on one or both sides, have up to seven of the permanent teeth missing. I think you will find that this characteristic is inherited.

Dr. Carter.—Dr. Epley, while you are on the subject you might explain, if you can, the development of the English bulldog with the undershot jaw.

Dr. F. W. Epley.—I was up at Mr. Burbank's the other day and through certain introductions I had quite an intimate talk with him. I had bred plants so I could talk his philosophy, and he told me this: The Japanese Government feared, on account of the introduction of synthetic silk, that their industry would be greatly menaced in their own country. They came to him and asked him to produce a mulberry tree with much larger leaves so they would have more food for the silkworms for their acreage of ground. He told them he would do it for \$500.00 and he showed me the tree he produced, with large leaves. The production of a thing like that is not very difficult. One could take a contract to produce a bean so long and to look a certain way. He could produce that bean in a very few years. What would he do? He would go into a bean patch and select the beans most nearly like that ideal bean he had in mind and use them as breeders. Then as mutations occur he would take those mutations that came nearest to the ideal bean and plant them and next year check them again. Finally he would produce the kind of bean desired.

Mr. Burbank did the same thing with the mulberry tree. He selected as breeders, the trees with the largest leaves and through that selection, year after year, developed the desired mulberry tree.

Now, about the bulldog. They wanted a dog that could seize a bull, or a critter by the hind legs or snout, or some other place and hang on, and not smother in the operation. Now if an ordinary dog, as I understand it, with a square nose seizes an animal he, by the act of hanging on, cuts off his own breath. So, they bred a dog, by selection, with an underjaw that would allow of breathing while hanging on to an animal.

Dr. H. L. Morehouse (closing).—Gentlemen, in the first place, I think that the discussion has been more beneficial than the paper. In fact, that was my idea in bringing up the subject, because I thought that would be just what would happen.

The subject is one, which, as has been said in the discussion, cannot be solved today or tomorrow, but as I mentioned in the beginning, before I read the paper, my idea was simply to bring out the discussion and at the same time try and impress on your minds the fact that we had been peddling a lot of what they call "bull" to our patients and our

people when we have been telling them that this or that malocclusion was inherited, because if malocclusion is inherited, then the orthodontic corrections certainly will be inherited because one is brought about from one cause and the other brought about by the reverse action from another cause. That is my own personal opinion.

In Dr. Sweet's remarks he brought out the principal point that I wanted to get over to you and that was the fact that I feel that the only benefit we are going to derive for posterity is through better physical development. That is, by giving them a better masticatory apparatus, a better breathing apparatus, and in so doing build up a better constitution for posterity.

I do not believe that we can place malocclusions, or orthodontic corrections, in the class of inherited characteristics because I think they are acquired in different ways. So far as the changing of the germ cells is concerned, every authority that I have read has been positive in that one statement that the germ cell was constant and cannot be changed by any exterior action of the physical body as anything that we did for the physical body did not change the principle of the germ cell.

I appreciate, very much, Dr. Epley's remarks because he is a man that has had a great deal of experience in this and I hope that the paper, and the thoughts that have been brought out in the paper, and in the discussion, will simply carry to your mind this one thing that we must be more careful in what we tell our patients about heredity and whether we are going to benefit posterity in the future by the correction of these malocclusions, because we are very liable to be caught up on this question quite often, in fact, most any time. I appreciate the discussion that has been brought out and I hope that if there are any of you who are fortunate enough to have a patient in which you can follow the question of heredity down through one generation after another, you might do so, and make notes of it and bring the subject up at our next meeting.

A CLASSIFICATION OF UNDESIRABLE ORTHODONTIC PATIENTS*

BY JAMES DAVID MCCOY, M.S., D.D.S., F.A.C.D., LOS ANGELES, CALIF.

Professor of Orthodontia, College of Dentistry, University of Southern California

IN THE practice of orthodontia there are cases which require great forbearance and tax our abilities to a supreme degree. In this respect we are not different from other professions who must meet and serve not only those who are desirable but must likewise take those who prove unsatisfactory from several standpoints.

If we attempt to classify these cases we will find that their actual number and character will change from year to year. Owing to the fact, however, that our cases are frequently with us for long periods the possibilities of their unfortunate advent is greatly increased.

Fundamentally, one of the guiding motives of any profession is the ability to successfully fulfill the aims of whatever work is being done and so the orthodontist has uppermost in mind the successful correction of maloccluding teeth. His ambitions along this line are both unselfish and selfish, for in addition to wishing to serve his patients, his efforts must be successful else his status soon becomes a matter of question and he becomes a candidate for a ride upon that swift toboggan known as failure. So, as a matter of self-preservation, he is certainly justified in taking all necessary precautions, for one orthodontic failure or one dissatisfied patient is a boomerang whose negative reaction vastly overbalances the positive reaction from numerous successful efforts. Any group of practitioners discussing the question of patients they would "rather not have" will offer a diversity of opinion. All will agree, however, that they desire those where faithful effort may be rewarded with successful end-results.

Transient Cases.—I believe the greatest measure of success can be obtained where an orthodontist is given the full responsibility of a case and is allowed to carry it through both primary and secondary treatment without interruptions occasioned by traveling, long vacations, etc. We have all seen the spectacle of the "traveling patient" who is taking a trip around the world or through Europe or across the United States going from one orthodontist to the other for appliance adjustments. The unfortunate results of such treatment have been apparent to me in many instances and I believe treatment under these conditions should be discouraged. Transient patients are not desirable to the busy orthodontist nor are his services to them apt to be more than palliative.

Unfinished Cases from Elsewhere.—Time without number, the writer has been consulted by solicitous parents whose children needed orthodontic treatment but who were not permanently located. They would usually preface their

*Read before the Southern California Section of the Pacific Coast Society of Orthodontists at the September meeting.

remarks by such a statement as this: "We intend to be here two, three, or four months and then we are going to such and such a place to live," or they may say, "We are simply here for the summer or for the winter and then we are going back home. Will you start the work and carry it as far as you can and then refer us to some orthodontist in our home city so that the work may be continued and completed there?" There was a time when I was willing to undertake cases under these conditions but now I positively refuse to do so unless the circumstances are extraordinary. My reason for this action is that the patient's welfare will be far better served if they wait until they are permanently located where one man will have the responsibility of the case throughout.

When cases come to me from other parts of the country with the work only partially complete, I cannot receive them with the same degree of enthusiasm which I feel toward those I have had from their beginning. Such an attitude may seem unfair to the patient but in justice to myself, I have found some such to constitute a veritable nuisance. In the first place, they have become accustomed to their first doctor, to his personality, methods, scale of fees, etc., and are not always amenable to the methods and policy which I employ. Every man has his own way of doing things and through his own methods, he is more apt to serve his patients best. Therefore he is within his rights if he insists on these cases coming into his official family upon the same basis as his other patients. This does not always suit the patient and gives rise to hard feelings either toward the new doctor or toward the old doctor or toward both of them, resulting in misunderstandings and questioned motives. I do not mean by this that any criticism is offered the work or methods of the other orthodontist but in spite of the most considerate and tactful handling of such a situation the patient frequently fails to get a just viewpoint of the matter.

Cases from Unscrupulous Practitioners.—Because of my location in California, I have during the past twenty years seen numerous patients whose orthodontic treatment had been inaugurated by the first doctor with the full knowledge that the patient would be with him but a short time. While we all realize that orthodontic interference should be carried out as early as possible, we know that a delay of a few months in the vast majority of cases is not going to work havoc in the mouth and therefore the action of an operator who "grabs cases" for a few months only is to be deplored. The above described cases sometimes constitute "educational exhibits" of a character which prove both amusing and enlightening. Only one practicing in a community having a large tourist crop each year can appreciate this but suffice it to say that some of the appliances are "fearfully and wonderfully made." They constitute all types, and frequently the patient will state that the home doctor sent away to Chicago or Minneapolis or some other large city and obtained the appliance from a leading laboratory. Such instances make us exclaim, "Orthodontia, what crimes are committed in thy fair name." And so for the above reasons, I am forced to place in the list of undesirables, cases from those unfitted for orthodontic practice.

Undisciplined Children.—We all have our full quota of children who show lack of proper home training. I fear we are apt to exhibit a harsh attitude toward such children which really is unjust, for the fault lies not with the child but with the delinquent parents. If the parents' shortcomings in this respect have been so great that the child is unbearable, the earlier we discover this, the better off we are for the chances for successful results under these conditions are certainly very small. In this class we can place those who consistently fail to keep appointments, those who tamper with appliances and thereby nullify their effects and those, who through their unreasonable attitude refuse to accept the slight discomfort incident to adjustments. If a plain dignified statement to the parents that such shortcomings must be overcome or the case will be given up does not get results, then such patients should be added to the undesirable list and eliminated from one's practice.

Undesirable Physical Types.—The writer has already made the statement that one of the fundamental motives which keeps us at work is the ability to bring the treatment of our cases to a successful culmination. If we are to do this, I believe there are certain physical types which we should either avoid or if we do take them, should do so only after making known to the parents or guardians the fact that permanent results are a matter of question. Prominent among this class are those cases having abnormally large tongues and which usually have mesiocclusions. The etiology of this type of malocclusion is certainly largely a matter of conjecture. Personally, I always think of them as endocrine types for the evidence seems to point to some derangement in development. Whether an abnormal functioning of the ductless glands has been responsible for this and if so, whether the present therapeutics along these lines will give relief to the condition, we cannot say, but certainly one case of this type can furnish more discouragement to the orthodontist than six cases of any other kind. Likewise, children suffering from idiocy are not fit subjects for orthodontic treatment and I believe the man who attempts the correction of their mouths wastes his efforts. When I speak of idiocy, I do not refer to those children who are simply slightly backward, for in such cases we doubtless have the opportunity of doing much good. I believe, however, they should be selected with care. Those incapable of giving cooperation should not be undertaken.

Children Whose Parents Have the School Complex.—All too frequently we come in contact with parents who have an exaggerated idea of the importance of school work and school attendance. Such parents receive with horror the information that it is sometimes necessary to keep a child out of school for orthodontic care, especially when cases are being started and a great deal of detail work is necessary in the construction of appliances. In spite of the fact that at most it may only be necessary to miss two half days at school for such work and notwithstanding the fact that it is decidedly to their own advantage to come the first thing in the morning when both the child and the operator are fresh and in proper physical and mental condition for such exacting work, the logic of this procedure usually does not appeal to such parents. If the correction of grievous oral deformities is not deemed by them of sufficient impor-

tance to allow the child to miss that amount of school work then certainly such people should be listed as undesirables. Important as school is and as much as we all wish to encourage regular school attendance we should not become blinded to the fact that some other things in life are worthy of equal consideration.

Unreasonable Patients.—Any practitioner whose experience has passed the decade mark has been afflicted with patients whose conception of the end-results of treatment is unreasonable. I mean by this that they hold the impression that every corrected case of malocclusion should bear a resemblance to a "dental parlor advertisement," all teeth in perfect alignment with no variations from this standard. If then after a correction has been made involving a change in relationship of the arches and the establishment of normal function between opposing teeth, or some other equally important developmental change, one tooth shows a tendency to overlap the tooth adjacent to it, or some other variation of occlusion occurs, they lose sight of the real object at stake, or the real benefits conferred and magnify what appears to them as failure. Some such are amenable to education but all too frequently they persist in their unreasonable attitude.

In a measure orthodontists and dentists alike are responsible for the present-day misconception as to what constitutes normal occlusion and until they become more universally enlightened upon the subject these unreasonable patients and their attitude will continue to be felt. Normal occlusion and ideal occlusion are not necessarily the same. Ideal occlusion is a thing to strive for but is rarely attained, and then only when the remainder of the human organism is ideal and favorable to its maintenance.

This problem then requires educational effort applied to two sources if we are to gain relief; namely, to patients and to our professional confreres. They must be made to realize that all organisms and their parts are subject to variation; that the teeth and jaws and their mutual arrangement which we term occlusion, are not exempt but vary with other parts of the body; that these variations occur around a certain average mean which we call the normal; that this normal is a standard of a functional nature which is not rigidly fixed, has different degrees of perfection but is rarely perfect. This is but biologic commonplace and should not need emphasis.

There are doubtless other cases which we should add to the undesirable list but at the present time they do not occur to me. Perhaps others who join in this discussion may disagree with me or from their experience be able to add to the list already mentioned.

REPORT ON ORTHODONTIC NOMENCLATURE SUBMITTED TO THE FIRST INTERNATIONAL ORTHODONTIC CONGRESS IN NEW YORK, 1926

THE Committee on Nomenclature appointed by the Board of Governors met on Monday, August 16, 1926.

There were present Drs. Dewey, Hellman, Hoffman and G. Northcroft in the Chair. The other members of the Committee, Drs. Chiavaro, Quintero and Subirana were unable to be present, Dr. Subirana approved the report, Dr. Chiavaro sent a communication to the Committee which was received too late to permit of any action being taken thereon.

The Committee were not willing to adopt the report as a whole and as there was such a short time for discussion it was agreed to delete those sections on which opinion could not be unanimous. The whole of part 3 of the report was so dealt with. In some cases, terms originally alternative have been preferred to those in common usage and therefore have been given precedence.

The Committee were convinced of the undesirability of coining new words or giving new meanings to old words without very grave consideration and consultation with others.

The Chairman has taken the responsibility (contrary to the majority opinion of the Committee) of placing the Osborne nomenclature as an alternative as there seems to be no satisfactory pronouncement of the question of the deciduous dentition which point was overlooked during the short time the Committee met.

1. Nomenclature of Teeth and Their Macroscopic Anatomy

ADOPTED TERMS FOR GENERAL USE				ALTERNATIVE TERMS	EQUIVALENT TERMS BUT REJECTED
right or left.	Maxillary or Mandibular	Deciduous or Permanent.	1st Incisor.	Upper or lower in- stead of maxillary or mandibular.	Medial Median or Mesial } Incisor.
r. or l.	"	"	2nd Incisor.	Central Incisor or Lateral Incisor in- stead of 1st & 2nd Incisors.	} Distal Incisor.
"	"	"	Canine.		Cuspidati Cuspid or Eye teeth.
"	"		1st Premolar.		1st Bicuspid.
"	"		2nd Premolar.		2nd Bicuspid.
"	"	Deciduous or Permanent.	1st Molar.		Milk, temporary or 6 year old.
"	"	"	2nd Molar.		Milk, temporary or 12 year old.
"	"		3rd Molar.		Wisdom Tooth.
<i>Note,</i> All teeth of the Premolar and Molar Series				Cheek teeth.	Back Teeth.

Dental Formulae

[illegible]

Suggested Signs

0 = Unerupted.	/ = Lost.
⊗ = Congenitally absent.	X = Lost Prematurely.
□ = Retained too long.	Λ = Erupting.

Divisions of a Tooth

ADOPTED TERMS FOR GENERAL USE	ALTERNATIVE TERMS	EQUIVALENT TERMS BUT REJECTED
Crown.		
Cervix	Neck.	
Root		
Apex		Fang. Pneuc

Areas Around a Tooth

Cervical Area.	
Radicular Area.	
Apical Area.	Radical.

Surfaces of Crown

ADOPTED TERMS FOR GENERAL USE								ALTERNATIVE TERMS								EQUIVALENT TERMS BUT REJECTED															
Labial for								$\begin{array}{ccc} c & b & a \\ 3 & 2 & 1 \\ \hline 3 & 2 & 1 \\ c & b & a \end{array}$				$\begin{array}{ccc} a & b & c \\ 1 & 2 & 3 \\ \hline 1 & 2 & 3 \\ a & b & c \end{array}$				Mesial.															
Buccal for								$\begin{array}{cccc} & & & e & d \\ 8 & 7 & 6 & 5 & 4 \\ \hline 8 & 7 & 6 & 5 & 4 \\ & & & e & d \end{array}$				$\begin{array}{cc} d & e \\ 4 & 5 & 6 & 7 & 8 \\ \hline 4 & 5 & 6 & 7 & 8 \\ d & e \end{array}$																			
Medial Distal Lingual for								$\left. \begin{array}{cccc} & & & e & d & c & b & a \\ 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 \\ \hline 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 \\ & & & e & d & c & b & a \end{array} \right\}$								$\begin{array}{cccc} a & b & c & d & e \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ \hline 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ a & b & c & d & e \end{array}$								Palatal.							

Incisal Edge

Occlusal

Morsal.

Approximal—relating to contiguous surfaces of adjoining teeth. Medial and Distal surfaces.

Proximal.

The terms medial, distal, buccal and lingual are used also to express tooth relationship.

Cusps

A. DECIDUOUS MOLARS

First Maxillary Molars

Medio-buccal cusp

Disto-buccal cusp

Lingual cusp

Second Maxillary Molars

Medio-buccal cusp

Disto-buccal cusp

Medio-lingual cusp

Disto-lingual cusp

Supplemental medio-lingual cusp

Tubercle of Carabelli

First Mandibular Molars

Medio-buccal cusp
 Disto-buccal cusp
 Medio-lingual cusp
 Disto-lingual cusp

Second Mandibular Molars

Medio-buccal cusp
 Disto-buccal cusp
 Distal cusp
 Medio-lingual cusp
 Disto-lingual cusp

ADOPTED TERMS FOR GENERAL USE

ALTERNATIVE TERMS

EQUIVALENT TERMS
BUT REJECTED

B. PERMANENT TEETH

Premolars

Buccal cusp
 Lingual cusp
 Medio-lingual cusp } Where 2nd Premolar has
 Disto-lingual cusp } two lingual cusps.

Palatal.

Maxillary Molars

Medio-buccal cusp	Paracone
Disto-buccal cusp	Metacone
Medio-lingual cusp	Protocone
Disto-lingual cusp	Hypocone
Supplemental medio-lingual cusp	Tubercle of Carabelli

1st Mandibular Molars

Medio-buccal cusp	Protoconid
Disto-buccal cusp	Hypoconid
Distal cusp	Hypoconulid
Medio-lingual cusp	Metaconid
Disto-lingual cusp	Entoconid

2nd Mandibular Molars

Medio-buccal cusp	Protoconid
Disto-buccal cusp	Hypoconid
Medio-lingual cusp	Metaconid
Disto-lingual cusp	Entoconid

The supplemental buccal cusp sometimes found on first temporary molars occurred so infrequently as not to justify inclusion in the foregoing.

Grooves, Fissures and Sulci and Embrasures as in Black's Nomenclature, except that "medio" and "medial" are used instead of "mesio" and "mesial" respectively.

Ridges

Marginal Ridges.
 Triangular Ridges.
 Oblique Ridges.
 Transverse Ridges.

2. Definitions of Orthodontic Terms**Maxillary Base:**

That part of the Maxilla and pre-maxilla upon which is superimposed the alveolar portion containing the teeth.

Mandibular Base:

That part of the mandible upon which is superimposed the alveolar portion containing the teeth.

Alveolar Portion:

That portion of either the Maxilla and pre-maxilla or of the mandible that contains the roots of the teeth.

Note:

These three terms are used in a descriptive sense and not with any morphological significance.

Dental Arch:

The arch formed by the crowns of the teeth.

Dental Arch Form:

The projection on a horizontal plane of the curve formed by the edges of the incisors, the cusps of the canines and buccal margins of the morsal surfaces of the pre-molars and molars of either jaw.

Vault: (Rejected term—Transpalatine arch)

The longest palatal border obtainable through a coronal section of a maxilla.

Dental Arch Relationship:

The dental arches are in relation to one another when the teeth are in occlusion.

Occlusion:

The relationship of the teeth of the Maxilla and Mandible when the jaws are closed and the condyles are passive in the glenoid fossae.

Ideal Occlusion:

A hypothetical standard of Occlusion based on the Morphology of the teeth.

Normal Occlusion:

That occlusion which is within the standard deviation from the Ideal.

Displacement: (Rejected terms—Gression and Trusion)

The malposition of the crown and root of an individual tooth to an equal degree and in the same direction. The prefixes medio-, disto-, bucco- or labio- and linguo- to "placement" indicate the direction of displacement. The prefixes supra and infra to "placement" express the idea of a tooth displaced in a vertical direction.

Inclination: (Rejected term—Version)

The rotation of a tooth around any transverse axis. The prefixes medio-, disto-, bucco- or labio- and linguo-, are used with "clination"; the prefix employed being derived from the tooth-surface concerned.

Rotation:

The turning of a tooth around a longitudinal axis. The prefixes to designate the direction of rotation of a tooth are a combination of the terms medio- or disto- with either labial or buccal or lingual. The terms medio- or disto- give the surface that has moved and the terms labial, buccal or lingual give the direction of rotation.

Malpositions may be varying combinations of Displacement, Inclination and Rotation.

Imbrication:

The overlapping of teeth in the same arch.

Separation:

The spacing of teeth in the same arch.

DISTOVERSION CASE FOR BOY SEVENTEEN YEARS OLD, WHO
HAS A VERY PROMISING VOICE, WHEREIN CORRECTING THE
MALOCCLUSION GREATLY IMPROVED HIS VOICE. OTHER
BENEFITS ALSO DERIVED THEREFROM*

BY HARRY ALLSHOUSE, JR., KANSAS CITY, MO.

THIS is a case report of a boy seventeen years of age, who had protruding upper anteriors, with bilateral distorelation of molar and premolar regions. The upper left first and second molars were in marked buccal occlu-



Fig. 1.



Fig. 2.



Fig. 3.

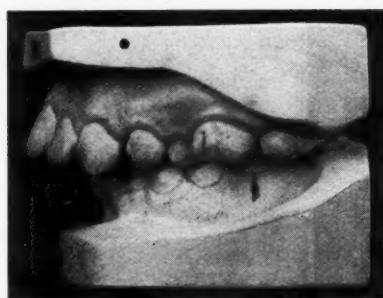


Fig. 4.

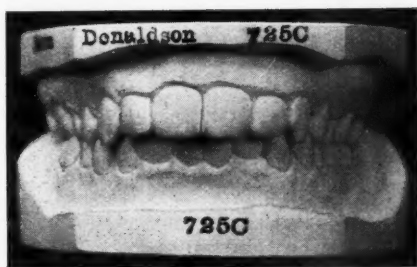


Fig. 5.

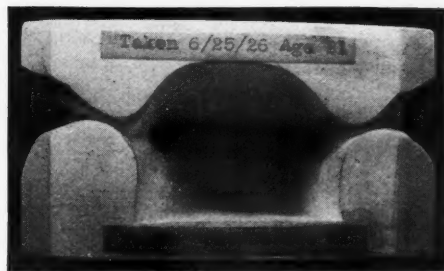


Fig. 6.

sion, thus giving a very constricted lower arch. The lower anterior teeth were occluding well to the lingual of the upper anteriors, which I tried to

*Case report before the First International Orthodontic Congress, New York City, August 16-20, 1926.



Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10



Fig. 11.



Fig. 12.

show in the position from which the photograph (Fig. 1) was taken. The photograph (Fig. 9) taken at the beginning of treatment, also shows the typical profile of a distoclusion case.

The case history of this boy does not show any unusual characteristics other than those to be expected in a case of this type, nor do the x-rays reveal anything unusual, and consequently are not included in this report.

I placed appliances on this boy the latter part of August, 1923, at the age of seventeen. The patient has been in the present condition for approximately nine months, which would leave about two years and two months for treatment. The teeth seem to be holding perfectly, as shown in Figs. 5, 6, 7 and 8; these photographs having been taken in June, 1926.

The appliances used in this case were of the Mershon lingual type, consisting of heavy body wire and recurring auxiliary spring. In connection with the lingual, I used labial arch made from 0.040 wire with intermaxillary hooks. I also used bands on left second molars with intermaxillary rubbers.

DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

Edited By
Clarence O. Simpson, M.D., D.D.S., F.A.C.D.,
and Howard R. Raper, D.D.S., F.A.C.D.

CLASS CLINIC. THE APPLICATION OF RADIOGRAPHY IN ORTHODONTIA*

(SYNOPSIS)

BY DR. CLARENCE O. SIMPSON, ST. LOUIS

ORTHODONTISTS are interested in radiography because it offers a means of determining otherwise obscure factors in diagnosis, prognosis, and treatment. The diagnostic information to be derived from radiographic ex-

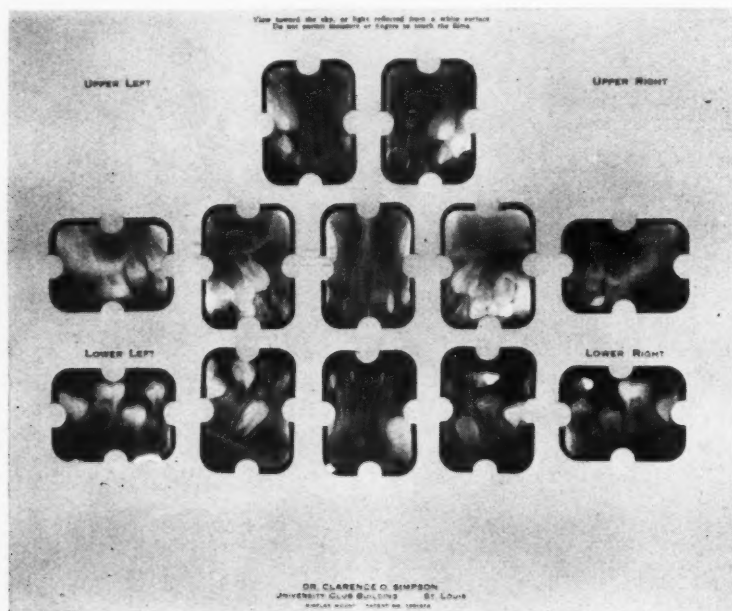


Fig. 1.—The twelve intraoral views required for orthodontic diagnosis.

aminations of orthodontic patients are: The number of teeth present, the size, form, location, and position of unerupted teeth, the progress of root decalcification, and calcification, dental caries and alveolar disease, and the

*Clinic before the First International Orthodontic Congress, New York City, August 16-20, 1926.

characteristics of bone structure. Radiographs are also useful as preoperative records, to examine the adaptation of bands, to illustrate appliances in operation, and to observe the results of treatment.

Radiographic examinations are indicated for each patient before attempting to establish a diagnosis, or institute treatment, and only by the routine use of radiography can the full advantages be obtained. This procedure is warranted by the proportion of cases in which essential data are revealed, and is always valuable in exclusion and verification.

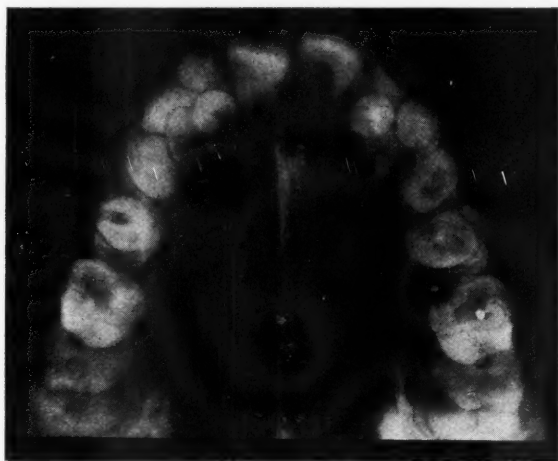


Fig. 2.—An occlusal view of a maxillary arch.

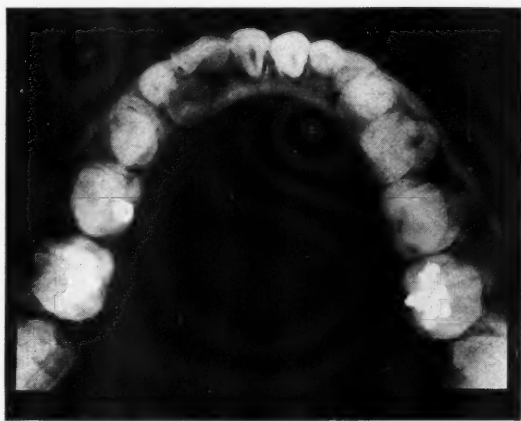


Fig. 3.—An occlusal view of a mandibular arch. ♦

A general radiodontic examination for orthodontic purposes consists of not less than twelve intraoral views (Fig. 1), occlusal views of the maxillae and mandible (Figs. 2 and 3), and extraoral views of the molar regions (Fig. 5). The intraoral views should be so allotted that there will be three of the maxillary incisor region, one of the mandibular incisor region, one of each canine region and one of each molar region. The occlusal view should be general surveys of each dental arch until after the eruption of the second

molars when three views (Fig. 4) will be required for the mandibular arch. The extraoral views should show the teeth in occlusion, and amply reveal the third molar regions.



Fig. 4.—The three occlusal views required for the mandibular arch after the eruption of the second molars.

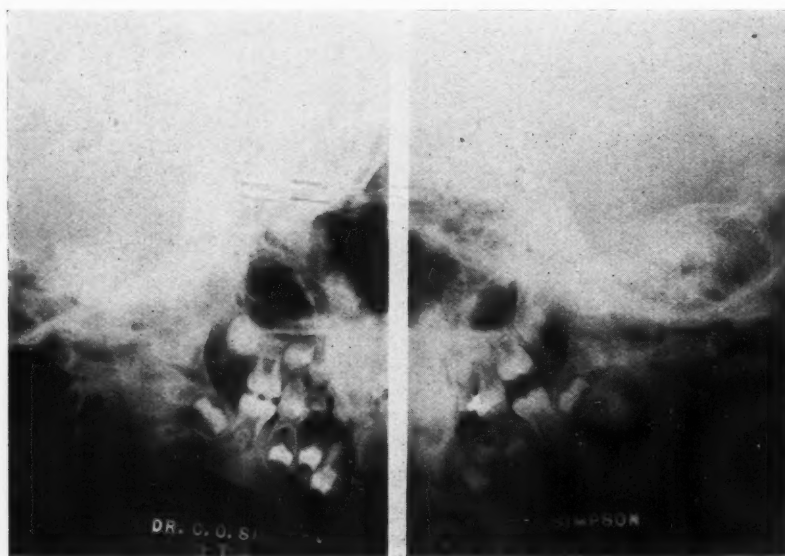


Fig. 5.—Extraoral views for orthodontic diagnosis.

For the intraoral views the average verticohorizontal angles of projection with the occlusal plane horizontal are: Forty-five degrees for the maxillary incisors and canines, thirty-five degrees for the maxillary molars, twenty degrees below horizontal for the mandibular incisors and canines, and fifteen

degrees below horizontal for the mandibular molars. For an occlusal view of the maxillary arch the projection should be about ten degrees posteriorly from vertical with the occlusal plane horizontal, and for the mandibular arch about ten degrees posteriorly to the perpendicular of the occlusal plane. The extraoral angle of projection should be twenty degrees below horizontal with the sagittal plane vertical.

With young subjects rigid precautions are necessary to minimize movement during the exposure. The assistance of the parent or nurse should be enlisted to retain the film packets for the intraoral views, and immobilize the head for the occlusal views. For the extraoral views a head clamp or a band-

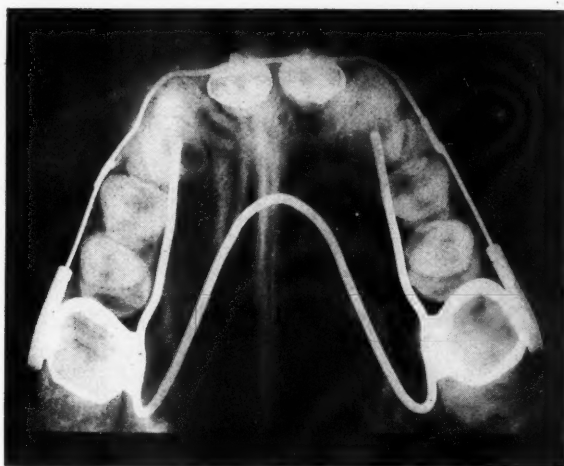


Fig. 6.—An occlusal view showing orthodontic appliances in operation.

age should be used to hold the head on the cassette. In examinations for orthodontic diagnosis extreme definition is not usually essential, so a shorter target-film distance than for other purposes is permissible to reduce the exposure time. Extra-fast films are not desirable except for maxillary occlusal views. Cassettes with two intensifying screens should be used for extraoral views. Radiodontic examinations are facilitated by systematic procedure, dexterity in placing the film packets, and obtaining the cooperation of the subject. The results are dependent upon the skill employed in the examination, and the effort expended in acquiring technical proficiency is rewarded by the gratification of accomplishment.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

A Case of Noma Following Measles. M. G. Winograd (Dixon, Ill.). The Dental Cosmos, August, 1926, lxviii, 8.

The patient, female, forty-five, was feeble-minded and in an institution, with incipient tuberculosis. She developed measles and was isolated and developed the noma process in the mouth about twelve days after transfer to the hospital. The initial appearance was on the inner aspect of either cheek and there was also some ulceration of the gums. There was no doubt of the gangrenous nature of the affection but the process did not exhibit the severe phagedenic character usually encountered in noma nor was the constitutional reaction as severe as the average. Some of the lesions in fact healed under such mild applications as permanganate and hydrogen peroxide. The ulcer of the right cheek, however, did not respond to these measures until after cauterization with fuming nitric acid. Bacterial tests showed only certain of the ordinary pyogenic cocci. No internal medication is mentioned. The supervision after measles, the gangrenous nature of the process as far as it went, including the odor of putrefaction and the need of strong cauterization, appear to leave no doubt of the diagnosis although the course of the disease was unusually mild. In the last year or two some remarkable results, even in severe cases of noma, have been obtained from 10 per cent solutions of copper sulphate without other treatment and it would have been of interest to test this treatment before the resort to nitric acid.

Angioneurotic Edema. J. L. Zemsky (New York). The Dental Digest, September, 1926, xxxii, 9.

The sudden and apparently causeless swelling which attends this condition may prove very puzzling to the oral surgeon, especially should it attack the jaws. The author has seen four cases during the past year but since the lips alone were involved in three the condition was not dental in any sense while the fourth case involved only the eyelids. Severe types which sometimes involve the floor of the mouth or throat suggest Ludwig's angina and at times cause a dangerous edema of the larynx involving the necessity of tracheotomy. Statistics show that one case in five is of the latter type and that death sometimes results before an operation can be performed. Although in many cases

the swelling comes and goes quite rapidly and the disease is in fact known as "acute edema" serial attacks simulating a chronic condition may at times be encountered. The first case described in a boy of sixteen had practically been present in early infancy, almost from birth, and consisted in repeated outbreaks which did not respond to any plan of treatment. The upper lip suffered most. In another case the attacks recurred every four or five months, at first on the upper and later on the lower lip. Taking acids and smoking appeared to be able to bring on attacks. A third patient developed the swelling in the eyelids and lips and the fourth, as stated before, in the eyelids alone.

Dental Infections and the Labors of W. A. Price. By R. Nogu  (Paris). *La Revue de Stomatologie*, October, 1926, xxviii, 10.

Professor Nogu  sums up the history of our knowledge of oral infection to the publication of Price's results of a quarter century of experimental investigation and gives a most exhaustive r sum  of the latter which occupies 28 pages of the *Revue*. Since Dr. Price's teachings should be well known to the American dentist there is no occasion to reproduce the summary of the same, which is apparently taken verbatim from Dr. Price's own version. Professor Nogu  contents himself with interpreting the doctrines of the latter without either approval or disapproval, although praising highly the enormous industry and persistence of the American author. However he seems to be much impressed with the possibilities unfolded and especially with the doctrine that visceral degenerative disease, which is responsible for the huge mortality from degenerative processes in the more vital organs, as the heart and kidneys especially. In addition Dr. Price seems to have shown that infected teeth may be responsible for many comparatively rare maladies, the etiology of which has always been in doubt, as Raynaud's disease, certain forms of phlebitis, ovaritis, herpes zoster, etc. When influenza appears to light up various local maladies it apparently does so by preference in those with foci of suppuration of the apices. Indirectly also the same cause may pave the way for social maladies not ordinarily associated with focal infection. Thus lesions in the skin of dental origin become cancerous and lowering of the defensive power of the blood may pave the way for tuberculosis and many other general conditions. If Dr. Price should be right, dental purulent foci should represent the greater part of etiopathology.

Risk of Dental Surgery Especially in Cardiovascular Disease. A. R. Barnes (Mayo Foundation). *The Journal of the American Dental Association*, October, 1926, xiii, 10.

Many diabetics present themselves for surgical treatment without any idea of their malady and even conservative operations are attended by increased mortality. In the Mayo clinic there has recently been noted a reduction of the latter, from 6.4 per cent to 1.2 per cent, as a result of the continuous practice of preoperative and postoperative care aided perhaps by the use of insulin. At the same clinic hyperthyroid subjects are refused operation save in emergency cases. The dental surgeon is especially menaced by hemophilic subjects and if the history is suspicious of a bleeder, it is best to test

the coagulability of the blood before operating. In severe anemia a transfusion should be practiced before operating and if necessary afterward too. The dental surgeon must be wary of operating in acute respiratory troubles. The anesthetics in use are relatively safe as shown by the fact that the general surgeon is glad to borrow them. In prolonged and multiple operations chilling of the surface is responsible for many postoperative complications and operations should be shortened, while every care should be taken to prevent loss of body heat. In subjects with cardiovascular disease an electrocardiogram gives the best idea of the state of the myocardium and often adds information of value in forecasting the longevity of risks; for example, in a certain electrocardiogram statistics show that the average expectancy of life is very small. In discussion Dr. Thomas states that he is ruled by the compensation of the heart and if this is satisfactory he fears no anesthetic or operative intervention if carefully supervised. Dr. Horine remains on the safe side by using regional anesthesia. Dr. Barnes in closing stressed that the most precautions are requisite in patients over forty.

A Prolonged Study of the Electrolytic Treatment of Focal Infection. Rhein, Krasnow and Gies (New York). *The Dental Cosmos*, October, 1926, lxviii, 10.

This article is a preliminary report of the Scientific Research Committee of the New York State Dental Society. The summary of the article is by Dr. Rhein and concedes the possibility that very many diseases may originate from dental focal infection. Dr. Rhein himself advocated this doctrine at a time when medical and dental men mostly ridiculed it—the period 1885 to 1900. Hunter deserves the credit for converting the medical profession to this view, so thoroughly in fact that the latter went to extremes of radical treatment with the unnecessary sacrifice of millions of teeth, but the pendulum is beginning to swing in the opposite direction. An important factor in this misinterpretation of danger to the general economy from infected teeth has been confusion of the terms “dead” and “pulpless.” It is possible to eliminate periapical infection by the electrolytic use of iodine and by sealing and isolating the roots from contact with living tissue under bacteriologic and x-ray checking up. Professor Gies of Columbia, with the assistance of F. Krasnow, has been at work on the bacteriologic control of conservative dentistry for the past ten years, while Dr. Rhein began to use electrolysis empirically as early as 1893. For rapid bacteriologic control it is of course necessary to resort to animal experiment, and infected teeth in dogs are readily sterilizable with electrolysis. In dental practice in man, where the object must be to sterilize without extraction, we must depend on the character of the roentgenograms after treatment and of course on the follow-up of the patient.

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EDITORIALS

The International Journal of Orthodontia, Oral Surgery and Radiography

THE twelfth year of the organization of the INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY is completed with this issue. When the Journal was founded, it was the intention of the publishers and those connected with it to render a distinct service to the specialty of orthodontics. The nature of orthodontic practice very early demonstrated to the publishers, the close relation existing between orthodontia, oral surgery and radiography. It was believed that a better service could be rendered to the orthodontic profession by so enlarging the scope of the Journal as to include these specialties. That the publishers decided wisely has been proved by the nature of the articles that have been published in the departments of Oral Surgery and Radiography. The intimate relations of the three specialties was

also proved by the type of clinics which were presented at the First International Orthodontic Congress.

With the organization of the Journal the publishers believed the best service could be rendered to the orthodontic specialty by endeavoring to bring together in one Journal all of the papers presented on orthodontics and the correlated specialties. Efforts were made to publish the transactions of the different orthodontic societies of the entire world. This idea met with the approval of the majority of the orthodontic societies and we believe that a study of the past volumes of the Journal will demonstrate that the publishers have rendered a valuable service to orthodontics of the present and future, by getting so many papers into one volume.

The sole purpose of the INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY is to render a service to the various specialties in its field. We hope in the future we may have as good cooperation or even better assistance from the various societies and members of the profession than we have had in the past.

As a means of improving the service of the Journal to the orthodontic profession, we are getting information for the purpose of adding a directory of the orthodontic societies. In this directory will be included the officers of all the orthodontic societies with the dates of meetings as far in advance as possible. This will be of untold value to the orthodontic profession because it will enable members to keep in touch with meetings of the different societies and possibly plan in advance to attend such meetings as they wish. This directory may also possibly avoid the conflict in dates of meetings which has occurred recently between two orthodontic societies that have selected the same day for their meetings.

With the closing number of Volume Twelve, we wish to assure our subscribers that we shall attempt to render them as efficient service in the future as we have in the past.

ORTHODONTIC NEWS AND NOTES

Round Table Discussion—American Society of Orthodontists

For the meeting of the American Society of Orthodontists, which is to be held in Chicago, the Board of Censors have arranged a round table discussion to be held from 12:15 to 2 o'clock on May 4th at the Edgewater Beach Hotel. This plan is one that is entirely new in the American Society of Orthodontists; it is patterned after a similar program which is followed by the Specialty Society of Periodontists.

This discussion will be held at a luncheon. Each table seating eight or ten persons will be in charge of a discussion leader who will direct the informal discussion of the topic assigned to his group. The results of the discussion will then be reported by the chairman at the close of the luncheon. Subsequent to the luncheon the leader of each table will make a formal report giving his opinion of the reaction and trend of thought exemplified and brought out in the informal discussion at each table.

A list of subjects assigned, along with the names of the leaders of the various luncheon tables as outlined above, will subsequently be published in the columns of the *INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY, AND RADIOGRAPHY*.

It is a further thought to institute this innovation and, in so far as practicable, bring about and direct a discussion of subjects in which there is a great deal of interest among orthodontists; subjects which are many times discussed formally but which are not often discussed informally. It is thought further that in informal discussion opinions are expressed more freely, a better understanding is possible of the true and honest trend of opinion upon many and varied subjects, which is sometimes difficult to bring to the surface in formal discussion on the floor of the meeting.

Service

With no obligation whatsoever the *INTERNATIONAL JOURNAL OF ORTHODONTIA AND ORAL SURGERY* is glad to provide information for the benefit of its subscribers and readers as follows:

Information as to available lists of Orthodontists practicing as a specialty throughout the world.

Lists of schools offering Postgraduate courses and instruction in Orthodontia in America and their locations.

Available lists of those practicing Oral Surgery as a Specialty.

Reference to any particular subject, or Department of Orthodontia, reference to any author which has appeared in the eleven years' files, and bound volumes of the INTERNATIONAL JOURNAL OF ORTHODONTIA AND ORAL SURGERY.

Please check information desired and mail to the International Journal of Orthodontia and Oral Surgery, 3523 Pine St., St. Louis, Mo.

Topics for Round Table Discussion at the Meeting of the American Society of Orthodontists

Up to the moment of going to press, the Round Table Discussion for the Meeting of the American Society of Orthodontists, to take place in Chicago, May 3, 4, 5 and 6, 1927, has been organized as follows. The discussions are listed according to the leaders of each group and the subjects which have been assigned to each table. Up to going to press, some leaders of table groups have not been heard from; accordingly their subjects remain unannounced until verification is received.

Dr. C. R. Baker, 708 Church Street, Evanston, Illinois.

"What is present status of the laboratory-made orthodontic appliance? Is it doing any service for the public or is it in the aggregate a failure? After all, the question is, Does it benefit the public? Can this question be discussed unbiased by orthodontists?"

Dr. Oscar Busby, 1208 Medical Arts Building, Dallas, Texas.

"On account of the constantly increasing demand for orthodontic service, should the general practitioner be encouraged to prepare himself to include orthodontic treatment in his practice?"

Dr. Frank Casto, 1336 B. F. Keith Building, Cleveland, Ohio.

Vice-Chairman J. B. Mershon, Philadelphia, Pa.

"Is the present orthodontic training in dental schools adequate?

(a) Should the course of instruction be extended?

(b) Is the present course of instruction comprehensive enough for the student entering general practice?"

Dr. Willard Flint, 5113 Jenkins Arcade, Pittsburgh, Pa.

"From clinical experience and observation viewed from an entirely prac-

tical and unbiased standpoint, is there any particular outstanding factor which is responsible for the prevalence of malocclusion as observed in everyday practice; if so what is the practical and popular reaction to this question?"

Dr. Jacob Gorman, 629 Maison Blanche, New Orleans, La.

"So-called rapid treatment versus slow and conservative treatment. What is the present trend of opinion?"

Dr. Herbert C. Hopkins, 826 Connecticut Avenue, Washington, D. C.

"What is the prevailing opinion about the treatment of deciduous dentures, Class I, Class II, Class III, and the expansion of the deciduous mandibular and maxillary arches?"

Dr. Harry Hosmer, 1211 Stroh Building, Detroit, Michigan.

"Is the matter of prophylaxis in orthodontic treatment pretty generally neglected in your observation? Should the orthodontists stress this point and discuss it more in order to deliver better service?"

Dr. C. C. Howard, Doctors Building, Atlanta, Georgia.

"The present status of jaw and arch anomalies as correlated with body growth, with special reference to endocrine influences."

Dr. Joseph E. Johnson, Suite 716 Starks Bldg., Louisville, Ky.

Vice-Chairman, Dr. Thad Morrison.

"Why do teeth decay under bands? What is the best method to prevent such decay? What are the advantages of direct and indirect methods of band making?"

Dr. A. H. Ketcham, Mack Block, Denver, Colo.

Vice-Chairman, J. Lowe Young.

"From an entirely practical standpoint and from observation in day to day practice, what is the present reaction to the possibilities of root absorption during orthodontic treatment?"

Dr. Charles A. Spahn, 47 Central Ave., Newark, New Jersey.

Dr. Lowrie J. Porter, *Vice-Chairman*, 730 Fifth Ave., New York City.

"A method of determining the position of the occlusal plane—can the lower six incisors be depressed and remain?"

Dr. Hugh Tanzey, 508 Commerce Building, Kansas City, Mo.

"If the practice of orthodontia is a true science, what is the most feasible plan to extend the service it has to offer to the masses in a competent manner?"

Dr. Oliver W. White, 406 Fine Arts Bldg., Detroit, Mich.

"What in your opinion is the best, most practical, and most satisfactory method from the standpoint of the patient alone, of handling cases one hundred miles or more remote from a skilled orthodontist?"

Dr. B. E. Lischer, 4707 Westminster Pl., St. Louis, Mo.

"Is progress in diagnosis desirable? Are intraoral occlusal diagnoses adequate and reliable? Are gnathostatic diagnostic procedures an improvement over occlusal methods?"

H. C. Pollock, Chairman Round Table Discussion,
4482 Washington Ave., St. Louis, Mo.

Notes of Interest

Dr. Manley Bowles announces the removal of his office to 504 Medical Arts Building, corner Graham and Kennedy, Winnipeg, Canada. Practice limited to orthodontia.

Dr. F. A. Leslie announces the opening of offices at 462 Elwood at Grand Avenue, Oakland, Calif. Practice limited to orthodontia.

Dr. Guy B. Fairchild of the Dewey School of Orthodontia, New York City, announces the opening of offices at 318 Bradley Building, Duluth, Minnesota. Practice limited to orthodontia.

Dr. Reuben Lloyd Blake announces the opening of his office at 414-415 Butler Building, San Francisco, Calif. Practice limited to orthodontia.

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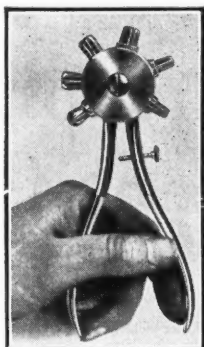
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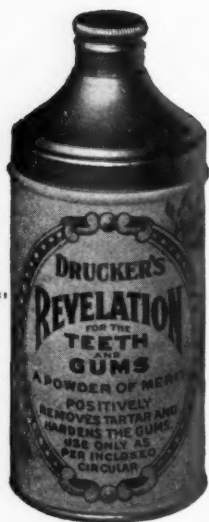
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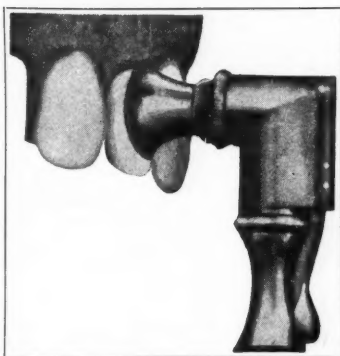
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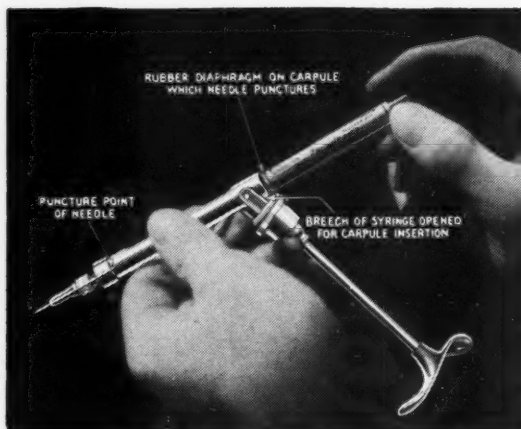
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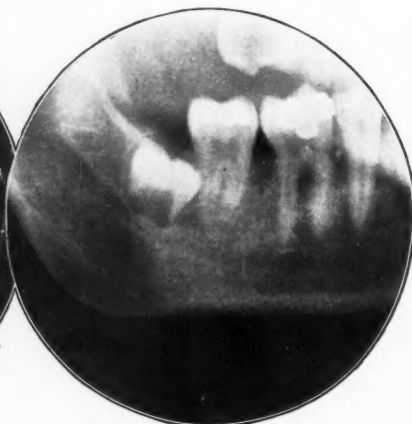
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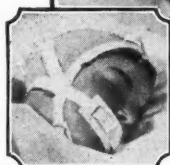
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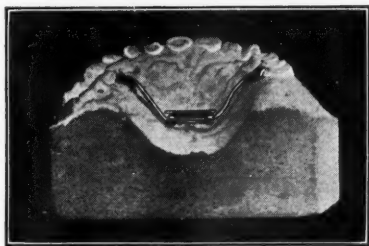


Figure 1

The mechanical design does away with tipping or rotating the teeth and obviates soreness.

Figure 2 shows a case in which an expansion of $6\frac{1}{2}$ M/M was obtained in one year, with no discomfort to the patient. The elastic bands were applied and changed by the parents. Note how well the general form and dimensions of the arch have been attained.



Figure 2

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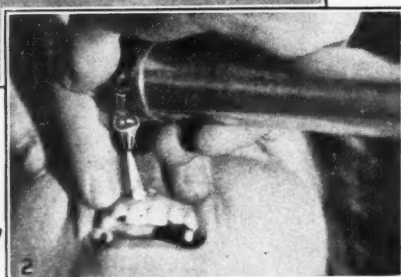
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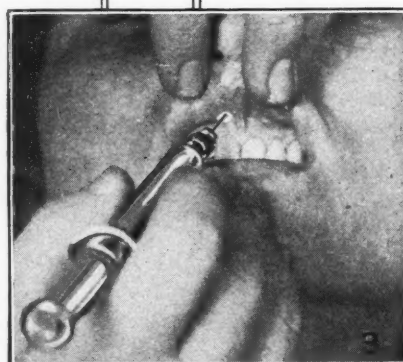


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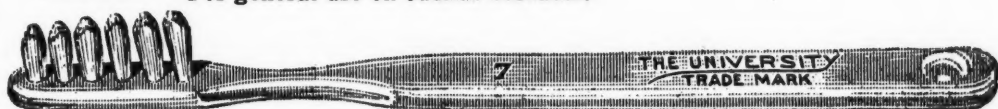


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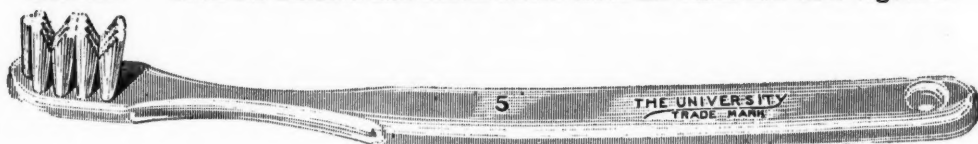


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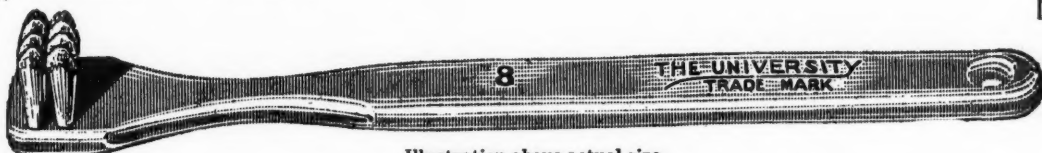


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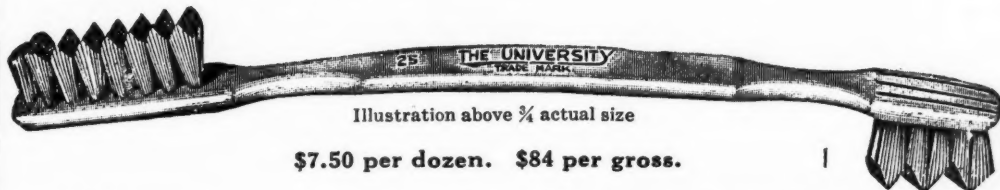


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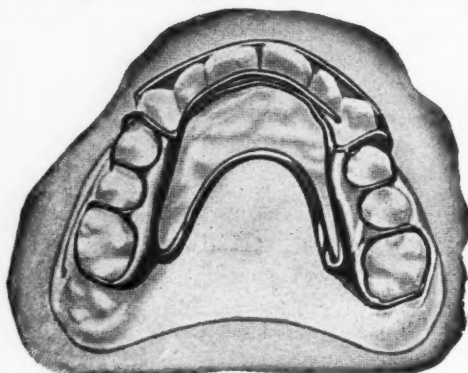
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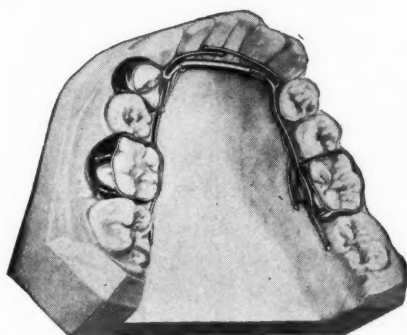
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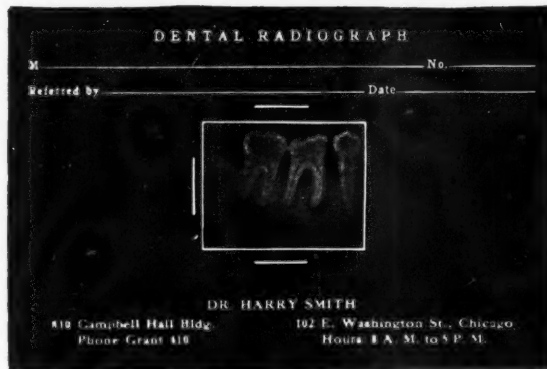
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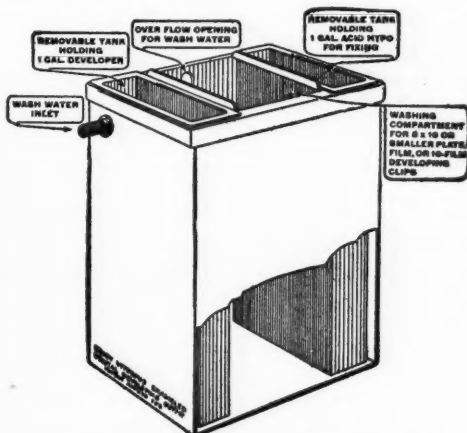
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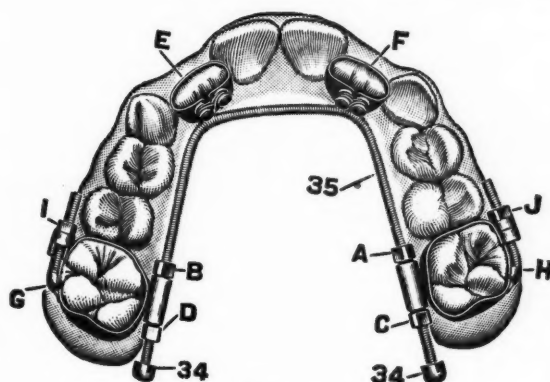


Fig. 1

A typical arch-bar appliance is shown in Fig. 1. In this case the lateral incisors are to be moved forward into line.

It will be noticed that the arch-bar is placed on the lingual side of the arch.

This arrangement will be found far superior to the old method of placing it on the labio-buccal side, for, when the appliance is placed on the lingual, it is entirely concealed.

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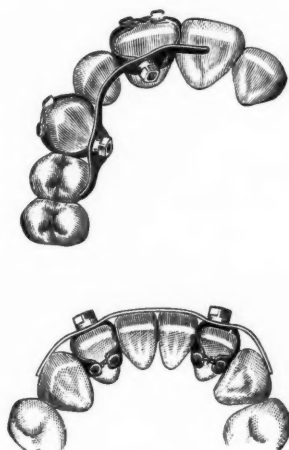
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At the left; the upper illustration shows the retaining-bar placed on the lingual side of the arch and arranged to hold five teeth in line.

The lower illustration shows the retaining-bar placed on the labial side of the lower arch. This arrangement holds the six anterior teeth in line.

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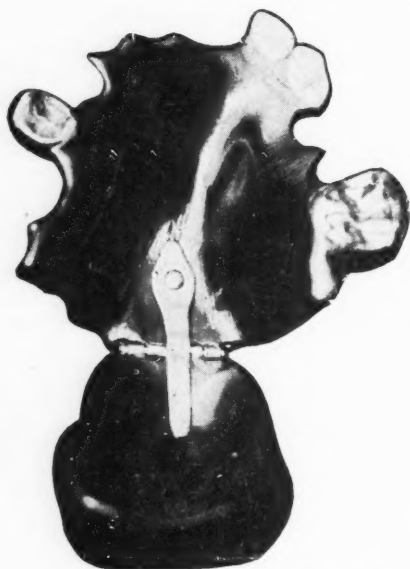
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By

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This book aims to be useful in the most practical way, to the young woman assistant who is anxious to render efficient aid to the dentist with whom she is associated and who has at heart the welfare of her patients. It also hopes to relieve, in some small way, the strain placed upon those doctors whose duty it is to teach the new assistant.

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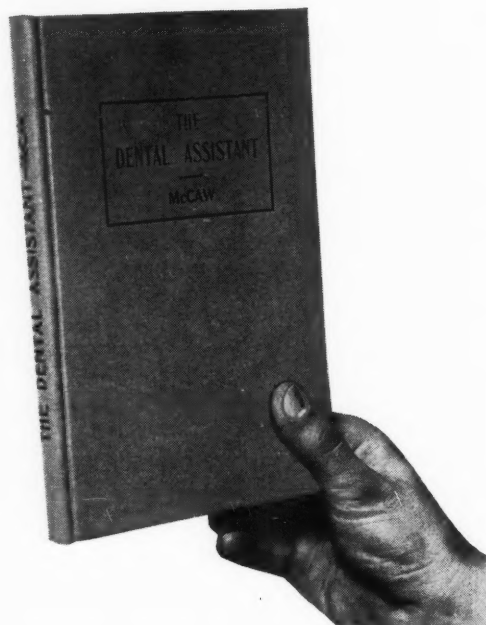
DR. C. N. JOHNSON SAYS:

The growing importance of the services of the dental assistant in daily practice lends an added interest to this book and makes its appearance at this time very appropriate. Any agency which will tend to increase the efficiency of the dental assistant and widen her horizon should have the hearty endorsement of the dental profession, because in the end the profession reaps the greatest benefit from her services. She has grown to be such an integral and essential part of every well-regulated dental office that whatever concerns her and improves her status affects in a similar way the practice of dentistry.

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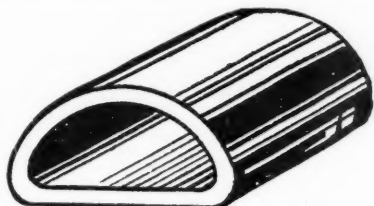
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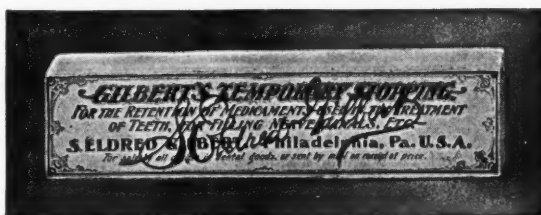
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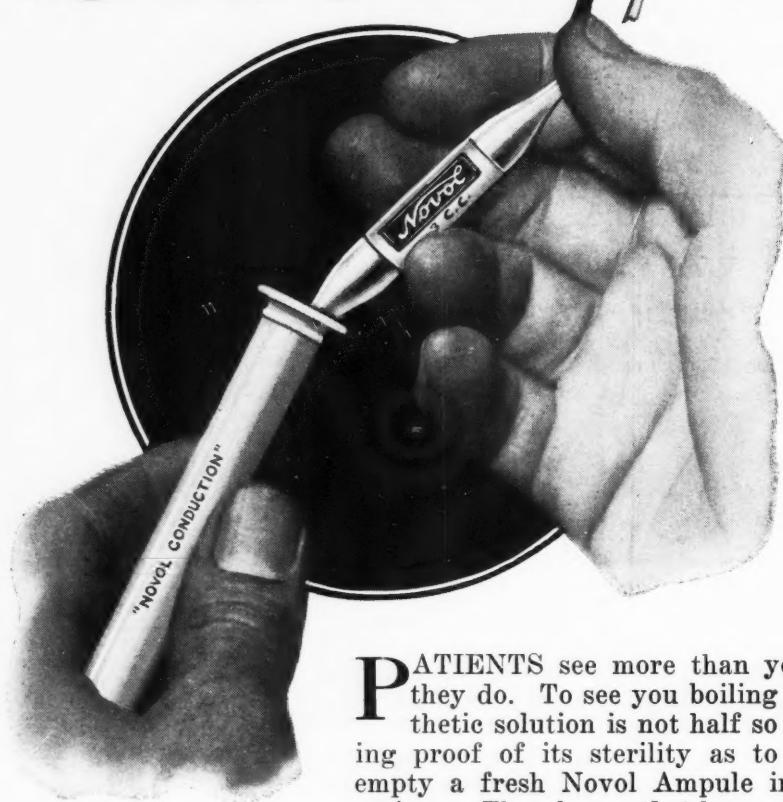
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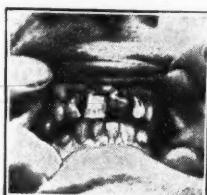
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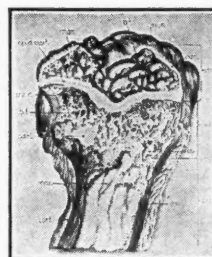
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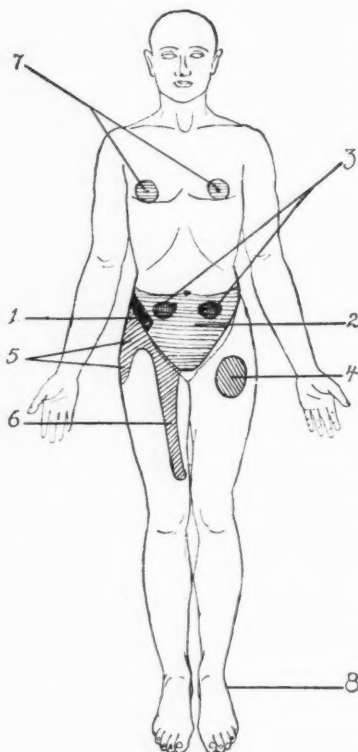
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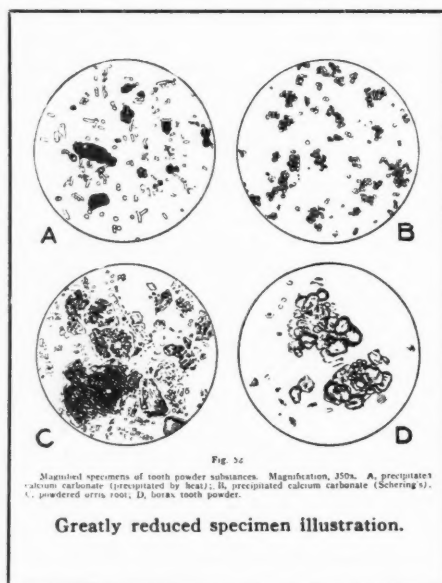
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